SUPPLEMENT.

The Mining Journal,

RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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Original Correspondence.

THE SCOTCH IRON TRADE—No. X.

THE CALDER IRONWORKS.

The history of the Calder Ironworks carries the memory back to almost primitive and elementary stages of the manufacture. One of the first works of any size established in Scotland, they have associations of the most interesting character. Their founders were a company, consisting principally of stocking weavers belonging to Glasgow, who had amassed a small capital, and expected that it could be turned to better and more profitable account in what was then a novel and comparatively new industry. The works, which were erected in 1795, were originally intended for the production of both coal and iron. The stocking weavers, however, did not succeed according to their expectations. They found that making iron and making stockings were two totally different things—that between the two there was a gulf fixed which they could not bridge over. Hence, after the partnership had been carried on with anything but encouraging results for a year or so, it was dissolved by mutual consent, and the works were sold for—it is said—the miserable consideration of 4000*l.* to Mr. William Dixon, of Govan, one of the original proprietors; Mr. James Creelman, of Pottery; and Mr. David Mushet, whose name is intimately associated with the discovery of the famous blackband ironstone deposits, which have since proved such a source of wealth to the West of Scotland. After the second partnership had continued in force for a period of about two years another dissolution took place, and in 1802 the works were a second time brought to the hammer. In the interim, however, they had been much improved, and, as they promised to become a good property, they were a second time acquired by Mr. William Dixon, who, however, became sole proprietor on this occasion, and retained David Mushet as his manager. Mr. Dixon was a man of rare insight and enterprise. He acquired, in connection with the Calder Works, what were then considered to be all the more valuable leases of minerals in the Airdrie and Coatbridge district, although he subsequently disposed of a considerable part of the lands so acquired to other ironmasters. Since the date mentioned the Calder Ironworks have continued in the hands of Mr. Dixon and his family.

As they now stand, the Calder Ironworks comprise six blast-furnaces. A seventh is in course of being rebuilt, having been modernised in shape and otherwise improved, with a view to more economical working. In this reckoning we do not include one of the first furnaces built at Calder Works, which has been out of blast for about 20 years, and which is now regarded more as a curiosity than as an available item in the list of mechanical appliances. All the furnaces are of the same height and style. Their height to the charging ports is 62 ft. 5 in.; but they reach a height of 62 ft. 2 in. to the tunnel head. The size of the hearth is 8 ft. 3 in., the depth from the bottom of the boshes is 6 ft.; the diameter at the top is 9 ft.; and the diameter in the middle of the furnace where the two angles of the dome meet is 16 ft. 6 in.—the angle of the furnace being 70°. Like the furnaces at Shotts Ironworks, and one or two of the older works on the West Coast, the furnaces at Calder are charged off a platform which runs along the entire length, or a total distance of 460 ft. This arrangement, while it obviates the use of elevators and gangways, is attended with considerable disadvantages, for it precludes the possibility of raising the height of the furnaces except at a great deal of cost and trouble.

So far as the Calder Works are concerned, however, the use of the platform obviates what might otherwise prove to be a decided drawback, for it is almost on a level with the branch of the Monkland Canal, along which a very large proportion of the minerals used at the works is conveyed from Mr. Dixon's pits, while the base of the furnaces is 40 ft. below in a deep gorge of the valley of the Calder—the stream from which the works take their name. It is from this stream that the water supply for the boilers and furnaces is obtained, the Calder Works being, like the Carnbroe Works, which we described last week, indebted to the same source for an ample and excellent supply of this commodity. From Sheepford Locks, as we have already indicated, there is a branch striking off the Monkland Canal, terminating within a few feet of the platform off which the furnaces are filled. This branch was constructed mainly for the use and convenience of the Calder Works, which have also access to the main lines of the Caledonian and North British Railways, so that they are well provided with the means of transit.

There is only one blowing-engine for all the furnaces at Calder. It is of immense size, filling a large house, which would readily be taken for a cotton mill of respectable proportions. There are two blowing-cylinders of 100 in. diameter each, the steam-cylinders being 8 ft. diameter, while the stroke of the piston is 10 ft. It is a beam-engine, and was built at the Govan Bar Ironworks in Glasgow about 30 years ago. There is a range of eight boilers immediately behind the engine-house, which are used solely in connection with the generation of blast. The blast is worked at a pressure of about 3 lbs. The heaters which are fitted up alongside the furnaces are of the usual kind, and contain 12 to 14 pipes each. The diameter of the receiver is 4 ft. Each furnace is provided with eight tuyeres, and there are men in connection with the works at which the tuyeres and other appliances are made and repaired.

Extension has already been made to the very large extent of mineral property which the founder of the Calder Works acquired at an early period of his career as an ironmaster. Since the commencement of the present century the proprietors of the Calder Works have been among the largest mineral lessees in Scotland, and although they do not now occupy the first rank, they come in a good second. For domestic purposes they work the Bretton and Todds quarry pits, at a short distance from Calder, with which they are in communication by a private line of railway. The ironstone used at Calder is chiefly taken from Fauldhouse, between Morningside and Bathgate, on the Clelland and Mid-Calder branch of the Caledonian Railway. The proprietors have also large ironstone leases from which supplies are drawn at Mugton, in Ayrshire; Ibrox, and Govan, near Glasgow; Bishopbriggs; and Balmule and Steelend, Fifeshire. As regards coal, an ample supply is worked for the benefit of the Calder Works at Carpin, Clelland, Blantyre, and Fauldhouse. On the latter estate there is worked what is called the Curly Field, extending to about 2000 acres. Limestone is obtained from Mr. Dixon's own grounds at Carluke, Waygateshaw, and Lugton. We may here mention incidentally that the Blantyre field has only recently been opened up. The extent of the field, which is situated near to Hamilton, is about 4000 acres. There is only one pit being worked at present—it having been commenced about the end of last year—but another is in course of being sunk, and will be ready for working operations very shortly. The depth of the main coal is 125 fms., but the splint coal, to which bores are now being sunk, is from 140 to 150 fms. in depth, while the main seam is about 6 ft. thick.

The present rate of production at the Calder Works averages 16 tons per shift, or 32 tons per furnace, in each 24 hours. The men are paid in the same way and at the same rate as those employed at the Carnbroe Works, which are situated on the opposite side of the Calder. The charge used in the furnaces varies a little according to the quality of the iron required, but it stands on an average in the proportion of 17 cwts. of coal to 15 cwts. of ironstone, and 2½ cwts. of limestone.

Upwards of 300 men are employed at Calder, and the works cover nearly 50 acres of ground. The demand for the Calder brand is such that the stock at the works is now almost infinitesimal, and we may conclude by saying of these, as we have already had occasion to say of other works, that while the production was never so great, it was never so unequal to the demand—a fact on which the proprietors are to be congratulated, when we add that since the invention of the hot-blast the prices obtained for Scotch iron have not been nearly so remunerative, all things considered, as they are at the present time.

THE VIEILLE MONTAGNE METALLURGICAL WORKS.

One of the oldest metallurgical enterprises in Europe is the Vieille Montagne Zinc Mines and Foundries Company. The grave circumstances which troubled and disturbed the last half of 1870 continued to exert a fatal influence upon the first half of 1871; nevertheless, the Vieille Montagne contrived to realise last year a profit of 58,818*l.*, of which 45,000*l.* found its way to the shareholders. The events of which France was the theatre in 1870 and 1871 paralysed the company's operations upon the French market, which usually absorbed a notable part of its production. It was only towards the close of last year that there was a revival of the welcome French demand, but in the autumn of 1871 it again attained some importance, and prices recovered in consequence. The other European markets suffered in common with the French from the war, and the operations of the company generally were more or less checked and impeded. Upon the whole, however, the company has passed well through the last two years, when account is taken of the enormous difficulties which have had to be overcome in order to maintain the various establishments of the concern in activity, and in order to enable it to meet and execute engagements contracted in periods of prosperity. The French market must still be said to be uncertain and agitated, but it displays from day to day a tendency to gather increased strength. As regards the other markets of the Continent, they have now regained an activity which promises to afford a very satisfactory future outlet for the company's products. Quotations for zinc, which had fallen extremely low during the disastrous period through which the company has recently passed, have been rising little by little of late, in consequence of a sensible diminution in the general production of zinc in Europe. They have now reached a point which they had not attained for several years past.

This state of affairs, although perhaps precarious, has none the less tended to compensate the company for the sacrifices which the war imposed upon the undertaking, and the Council of Administration has been enabled to turn the situation to all the more profitable account since they have large supplies of minerals at their disposal. The progress of the company's establishments and commercial operations was nearly the same last year as in 1870. All the various works were maintained in activity, but during the first half of 1871 its products were disposed of at comparatively unremunerative rates; this circumstance explains the reduction which the profits experienced last year. In the course of the past 12 months 63,197 tons of rough minerals of all kinds were obtained from the company's mines, and 46,212 tons of minerals were purchased, or about half less than in 1870. The quantity of lead minerals produced was 3870 tons, and 75,771 tons of minerals were delivered to calcination. The quantity of coal extracted from the collieries of the company was 93,913 tons; the quantity of rough zinc produced was 41,129 tons; of zinc white, 6851 tons; and of rolled zinc, 27,462 tons. The quantity of zinc of all kinds sold by the company last year was 42,564 tons. The number of persons employed by the company at the close of 1871 was 6978. The company's Rhine mines have suffered since July, 1870, from the want of labour occasioned by the war, and even now they have not yet regained their full production. This circumstance is, however, partly attributable to the active revival of the iron trade in Germany as well as in the rest of Europe, which has had a great tendency to render labour scarce and dear. The company's Belgian mines, as well as its Swedish mines, have not been interrupted by the war; the latter have, however, experienced a check in the washing department in consequence of a drought unexampled for at least half a century. Some rather important changes have been made in the metallurgical establishments of the undertaking. Thus, the directors have transferred to Borbeck the production which can no longer be carried on so advantageously at Mulheim. This measure quite coincided with the diminished arrivals of foreign minerals, and it was justified likewise by the fact that it has had the effect of concentrating operations in the works, which produce at a comparatively cheap rate. The company's works at Bray and Asnières, in France, which had been stopped by the war, have nearly regained their habitual activity. Asnières, which had suffered considerably from bombardment, has been repaired at no great expense. The directors have created a new establishment at Viviez, in the centre of France, in consequence of the falling off in the receipts of foreign minerals in the company's Belgian works and furnaces and their consequent idleness. The works at Viviez now produce 180 tons of rough zinc per month, and this production is expected to be shortly doubled, the construction of sundry accessory works having been commenced. It is hoped that by the close of 1873 the Viviez establishment will have acquired a real importance; it is assured supplies of minerals by contracts providing for the delivery of minerals from Spain and Sardinia. A new working combination has also been concluded in conjunction with an English company with reference to mines of calamines in Sardinia; this combination has been entered into upon the same bases as another with the Iglésias Company. Finally, an application made by the company for a concession of mines in Algeria, after the apparent removal of many difficulties, seems to be on the point of receiving a solution particularly favourable to the manufacturing operations of the undertaking in France.

GOLD MINING IN COLORADO—No. III.

Sir,—The statement, "Now, since at least 40 per cent. of the gold in $35 ore is thus sent to the pile of tailings," may mislead, as the calculation afterwards assumes 60 per cent. has escaped. All the escape does not stop at the pile, unless the whole flow is settled, which is seldom or never attempted. It was calculated that in 1870 the stamp mills used 120,000 tons of ore. Adding 10,000 tons for increase in 1871, 130,000 tons would fairly represent the stamp mill consumption for last year. The bullion product was stated to be $4,643,000, in 1871, for all Colorado, and also that two-thirds of this was the product of Gilpin County. For general calculation this is sufficiently correct, making $3,095,200 the gross amount of bullion turned out from Gilpin. This includes the shipment of $923,000 in matt, the smelted product of 1st class ore and buddled tailings. The value of the latter can only be assumed, hence (say) $323,000 product of mill ore tailings, and $600,000 product of 1st class ore. We have then $2,495,200 as the value of the bullion product of 130,000 tons of mill ore. The value at $35 per ton, however, would be $4,550,000, of which, according to the figures in my last communication, only 59 per cent. could be saved by mill and by buddle, viz. —$2,684,500; here is a difference between the results, so differently reached, of only $1·40 per ton. In this way it may be shown by figures that Gilpin County actually wastes certainly over $1,500,000 in getting $2,495,200. Stated in other words, the gross bullion product, including matt, is $500 yearly to every man, woman, and child in the county, whilst the loss is over $250 to every soul in the county. This is a production of about $2000 to each able-bodied man, and a loss of $1500 = $3500, a gross capacity of *per capita* production scarcely equalled by any other 1200 men engaged in any industrial enterprise. Some incidental proof of this rests in the fact that the Cornish miners have on deposit in the three banks of Central City over $500,000, drawing interest, I believe, at 10 per cent. per annum. As these deposits stand in the names of the few, not the many, it is an exhibit, perhaps, not easily matched.

In order that no exaggeration shall be imputed, it may also be stated that 84 assays of common tailings, made by the best assayers of the county in the regular course of business during two years, for actual tests, represent the value of many thousands of tons in piles, either on sale or for buddling. These tailings represent not less than 60 per cent. of the original ore. The average of these 84 assays being $23·15 in gold and silver, we have then the value of $13·89 per ton of the original ore in the tailings. Then, for the loss in the flow, Kustel says 12 per cent. of gold is lost in careful concentration, and at times very much more. At the St. John del Rey 10 per cent. of gold is said to be lost after the greatest care to stop everything. Rittenger states the loss of sulphide of silver at 35 to 45 per cent. when the best precautions are used. The flow of the mill must then lose 10 per cent. of the gold and 40 per cent. of the silver sulphide.

CALCULATION.

In pile, as above, per ton of original ore	$13·89
Loss in the flow—gold and silver in alloy	2·40
Loss in the flow—sulphide of silver (40 per cent. of $10)	4·00
Escaped from the battery and tables	$20·29

60 per cent. of escape from $35 ore is $21.

Now, the buddle saves of this $13·89, only about 40 per cent. of the value, according to tests by experts and the general experience in the county.

We have then for loss $6·40 + $8·33 = $14·73.
By the former method of calculation—loss $14·35

There is reason to believe that the loss is even very much more serious. Not one-half of the tailings are buddled—very many in consequence of inaccessibility to sufficient water, some from carelessness, and generally from a general looseness in this regard. Buddlers are a class of themselves—some of them give trouble, some cheat; hence millmen, at times, prefer not to be bothered in attempting to save a product out of which they are likely to be defrauded in the end. It is more than probable that 50 per cent. is not saved from the ores raised in Gilpin County jointly by the mills and the smelting works. Had this been the case in California and Australia veinmining for gold in those celebrated districts would have been abandoned long since. That Colorado can or should survive under such circumstances is of itself an incontestible proof of the great wealth of her gold mines. Correct and reliable information on this subject is so desirable, that I feel it worth while to sustain the most important of my conclusions by quoting the labours of others leading to like conclusions, but by very different modes of calculation. I again allude to Mr. Reichenecker's work, already referred to as published in Prague in 1871, and, with your permission, will fill this communication with a liberal extract.

RESULTS OF THE WHOLE TREATMENT.

Gold occurs in the ores of this region almost universally, not disseminated in the gangue, or, at least, only so to a very small extent, but contained in the ore proper, both in iron pyrites, and (chiefly) in the copper ores, while the zinc-blende and galena contain only silver. Auriferous iron pyrites are usually fine grained, loose in texture, and frequently imbedded in or mixed with pulverulent silica, while the gangue proper is a mixture of quartz and (greenish) felspar, or even consists of hornstone. The iron pyrites never contain silver in considerable quantity aside from that which is alloyed with the gold. The auriferous copper pyrites is very seldom fine grained like the auriferous iron pyrites. It is occasionally finely disseminated in hornstone, but usually presents crystalline aggregates with sub-conchoidal fracture, always mixed with aggregates or crystals (usually cubes) of iron pyrites. The crystalline pyrites is traversed in all directions by quartz threads, or mixed with more or less fine granular silica. The copper pyrites always carries silver as well as gold. Next to copper pyrites occur most frequently

variegated copper ores, containing considerable gold and silver. With reference to their contents of gold, the veins of this district may be divided into two classes, the total rock hoisted from the first class having an average assay value of $36 per ton of 2000 lbs. in gold, containing 20 per cent. silver,* and that of the second class not exceeding $21 (in gold).* The veins of the first class comprise scarcely one in a hundred of those hitherto developed.

* Mr. R. did not have sufficient general data for estimating the average contents in silver, hence places it low. He gives $1 more, however, in gold to the second class ore than I did in my calculations to the average ores of the district, including his first as well as his second class.

In mines of the first class the rock hoisted (which has a specific gravity of about 3) is sorted, as has been remarked generally at the time of sending it to grass, and the fragments of richer ore are separated. The weight of the selected ore is 4 to 25 per cent. (average 10 per cent.) of the total mill rock—*i.e.*, for 900 cwts. sent to mill 100 cwts. are reserved as rich ore, and has a market value of $30 to $70 (average, say $60) for its contents in gold silver and copper. The proportion of silver to gold is highly variable, it ranges from one to ten times as much by weight—there may be, on the average, four times as much silver as gold. The proportion of copper is also variable; it bears, however, generally, an approximate relation to that of gold and silver, and may be estimated to average, in the total rock from mines of the first class, 3 to 4 per cent. Under these conditions the above average selling price of selected ore ($60 per ton) represents an assay value of—

4·5 ozs. gold (per ton)	$ 93·00
18 ozs. silver ,,	23·40
9 per cent. copper per ton	18·00
Total	$134·40†

† 216 assays of this class, heretofore stated, $97·36 gold, $33·43 silver. These 216 assays were made of samples taken for sale of the ore, and represent the bulk of first class ore smelted during two years. Adding for the copper, as above $148·99 would represent the average value of first class or smelting ore, according to the Tables of Assay.—B.

The only smelting establishment purchasing these ores in Colorado, pays at the works 63 per cent. of the full value of the silver and copper, while the price paid for the gold is considerably less, though it rises with the quantity of gold in the ore. For the above proportion of $93, gold per ton, only about 35 per cent. of its assay value is paid; this gives for the gold $32·80; for the silver $15·20; and for the copper $12, or in all $60; being 44 to 45 per cent. of the full value. The mill rock of the first class, remaining after the selected ore is removed, then contains an average of about 1¾ ozs. of gold ·800 fine (20 per cent. silver), worth 29·40 per ton. The total contents in gold, silver, and copper average about as follows, per ton:—

1·4 oz. gold	$28·94
5·6 ozs. silver	7·28
2·8 per cent. copper	5·60
Total	$41·82‡

‡ 428 assays of mill ore, heretofore stated, during two years $22·56 gold, $17·51 silver—nearly $6 less of gold, and $10 more of silver.—B.

The specific gravity of this mill rock is about 2·9. The specific gravity of the rock from veins of the second class is usually in the neighbourhood of 2·8. There is here no selection of the best pieces, the whole is sent to mill. The copper contents seldom exceed 2 per cent. The whole valuable contents of these veins are, therefore, estimated, at maximum, per ton:—

1 oz. gold	$20·67
4·1 ozs. silver	5·33
2 per cent. copper	4·00
Total	$30·00 §

§ In the calculations heretofore stated, for both of the classes above, I gave $20 gold, and $15 silver as the average—less gold, more silver. Perhaps my silver average is large, but in 428 assays $100 gold carried $77·65 silver. Suffice it to say, neither Mr. Reichenecker, nor any expert in Colorado, appreciated the quantity of silver contents of these ores before I made the investigation on the basis of the territorial assays and private assays made for two years in the regular course of office business.—B.

The average assay value of concentrated tailings may be set down as follows. From mill rock of the first class, per ton:—

2 oz. gold	$41·34
6·5 ozs. silver	8·45
1·9 per cent. copper	3·80
Total	$53·59 ‖

‖ My statement was 132 assays, $49·42 gold, $8·58 silver, or $8 more of gold—a difference of only 13 cents in silver; this being the average for all mill ore tailings when concentrated.—B.

From mill rock of the second class, per ton:—

1·40 oz. gold	$28·94
3·50 ozs. silver	4·55
·5 per cent. copper	·70
Total	$34·19

The smelting works pay for tailings of these grades respectively about 21⅝ and 18½ per cent. of the assayed gold value, and 65 per cent. of the assayed silver and copper value; or, for first class tailings, gold $8·96, silver $5·50, copper $2·48—total, $16·94 per ton; and for second class tailings, gold $5·36, silver $2·96, copper 46 cents—total, $8·78 per ton.

SUMMARY.

The economical results of the whole mining and reduction may now be presented, according to the foregoing discussion, as follows, culculated upon the basis of 50 tons of ore:—

For veins of the first class— 1. SELECTED ORE.		
Sale of 5 tons at $60		$300·00
Cost of mining and hauling		30·00
Profit		$270·00
2. MILL ROCK.		
Stamp mill (steam power)—		
Yield of plates, 40 per cent. of $29·40 for 45 tons	$529·20	
Mining and hauling at $6 per ton	$270·00	
Crushing and amalgamation, at $3·84 per ton	172·90 =	442·90
Profit		$ 86·30
Pans and dolly tub—		
Yield 4 per cent. of $29·40 for 45 tons	$52·92	
Expenses at 14 cents per ton	6·30	
Profit		46·62
Concentration of tailings—		
Sale of 2·25 tons at $16·94	$38·12	
Cost of concentration at $4 per ton	$9·00	
Cost of hauling at 36 cents per ton	·81 =	9·81
Profit		28·31
Total gross profits on 50 tons rock		$431·23
Deduct for management, taxes, &c.		63·00
Net profit per ton at $7·36		$368·23
For veins of the second class—1. SELECTED ORE (none). 2. MILL ROCK.		
Stamp mill (steam power)—		
Yield of the plates 40 per cent. of $21 for 50 tons	$420·00	
Mining and hauling at $6 per ton	$300·00	
Crushing and amalgamation at $3·80 per ton	190·10 =	490·10
Loss		$ 70·10
Pans and dolly tub—		
Yield 4 per cent. of $21 for 50 tons	$42·00	
Expenses at 14 cents per ton of mill rock	7·00	
Profit		$ 35·00
Concentration of tailings—		
Sale of 2·5 tons at $8·78	$21·95	
Cost of concentration and hauling at $4·36	10·90	
Profit		11·05
Gross loss on 50 tons rock	$24·05	
Add for administration, taxes, &c.	62·50	
Giving a total loss on 50 tons mill rock at $1·73 per ton		$ 86·55

This concludes the extract.

Per Mr. Reichenecker, 50 tons 1st class ore, as raised, smelting ore included, is worth by the average, as above	$2453·90
The gross yield, as above, including smelters' margin, is	1412·81
Actual loss	$1041·09

My conclusion in last letter (irrespective of the copper, which will not materially affect the result) was—loss, 41 per cent; saved, 59 per cent. Now, 41 per cent. of $2453·90 is $1010·13, and 59 per cent. is $1443·77 = difference $30·96 = 60 cents per ton—calculations made from data entirely different in character. Mine were obtained from official records of assays. His were of his own gathering and analysis. His manuscript was never published in Colorado, and was in Germany when I made my transcripts. Mine are published now for the first time from calculations written up one year before I saw or knew of Reichenecker's work. B.

Central City, May 1.

A NEW SCIENCE—HYDROSCOPY.

SIR,—Allow me, by the present letter, to direct the attention of your readers to a modern and yet imperfectly known science, the applications of which have considerable practical importance, and are not devoid of interest to the reading public at large. I refer to the science whose object consists in studying the subterranean waters, the kinds of ground where they are to be found, their flowing, the physical laws that rule their abundance or scarcity, and their depth.

The circumstances which accompany the circulation of water on the surface of the earth have been thoroughly studied, but few persons have surmised what becomes of the rain-water absorbed by the soil, and still fewer have tried to account for it. A Frenchman, however, named Paramelle, resting his researches on sound geological knowledge, devoted himself to the solution of this problem, and to the applications of the principles he had discovered by long experience. The science is now complete; it has received a name—Hydroscopy, or Subterranean Hydrology—and its applications are perfectly definite.

Among these we must place in the first rank the discovery of springs, and selection of well sites. Let the reader think of the immense practical benefits it is possible to reap from such a science; how many towns, villages, and private estates are deprived of water, or obliged to get it from remote places, at enormous expense. At this time so grave a deprivation is no longer irremediable. Within easy access of every village, almost of every house, and generally at a little depth below the surface of the soil, there exist subterranean streams of water. By a simple digging (indicated after a thorough survey of the place, and not by the aid of those clever divining rods that have made so many dupes) one can channel out these hidden streams, and make them flow on the surface; or else a well can be sunk on their course, and the place formerly deprived of water will become abundantly supplied with it,

Is there any science which deserves more to be studied? One may oppose that these are promises of theory, and that practice may considerably lessen down such expectations. To this I will reply that the applications are not to be made that Paramelle has discovered over 9500 springs, that he has disciples who are not less successful than he was, and continue illustrating by facts the excellence of the method. I might add long developments about the applications of the science referred to, but fear I should be intruding too much on your columns. I conclude, therefore, trusting that you will judge the subject worthy of public attention, and, on this account, admit these few remarks. LEON JOURD'HUI, Hydrologist.

Linden House, Twickenham, May 22.

BLAKE'S STONE CRUSHER.

SIR,—Having recently visited the Terras Mine, I examined Blake's Patent Stone Breaker at work. I went thoroughly into it as to the cost; labour and coals are now high; I found the cost about 3d. per ton. It had two men attending it; these threw in stones 20 in. × 10 in., and I can openly say it is the most effective machine to be used in mines that I ever saw worked; but this machine is brought into Cornwall by a stranger, as I have before hinted, and not by an Ancient Briton. I give Mr. Hocking credit for first breaking the ice, and conforming to the age we live in; I believe him to be a good practical engineer, and will carry out what he takes in hand. I have only to say that Mr. Blake has nothing to fear as to the utility of his machine; it will ultimately come into general use in mining, but it requires patience to get the remnant of the Ancient Britons left to move in improvements. N. ENNOR.

P.S.—Every mine in the country should have Blake's Crushers.

IRON AND COPPER MINES.

SIR,—The mania for iron mines has at last reached its zenith: setts in Cornwall, Devonshire, Somersetshire, and Gloucestershire have been taken up by the score, and not a tithe of the lot have any commercial merit in them whatever. Small veins or lodes of from 4 ft. to 6 ft. wide never have paid where pumping machinery is required: the cost of working mines during excited periods, just like the present, is lost sight of. The expenses in working a mine where the minerals realise a few shillings per ton is as great as working a copper mine, from which the ore fetches, in most instances, as many pounds per ton as shillings in the other.

The last few months iron mines of all descriptions have been introduced to the public, just as lead mines in the Principality of Wales were introduced some two years ago. Not one in 10 of the schemes have turned out a success. The iron rage is just such a period of insanity. Copper mines will and must command the attention of the British public. New mines invariably pay investors best, on account of the little expenses in the working young mines compared to mines from 100 fms. to 300 fms. in depth. Iron ore ought to be found in very large lodes, or in quarries, to be profitable. Very few iron mines in the Forest of Dean have paid the investors back a shilling in the £, and such will be the case with a host of schemes now being introduced in various parts of the kingdom. No second Van has yet been found in Wales—time is required to develope mines generally. The Old Wheal Vor took eight years to explore and lay open before even a ton of tin was returned, and at a cost of about 60,000*l.*

London, May 22. A. BENNETT.

ON WHAT DOES METALLIC MINING DEPEND FOR ITS GENERAL SUCCESS?—No. III.

SIR,—In concluding my last letter on this subject I proposed to notice in this some of the more prominent features of metallic mining in its varied detail, and I shall begin by saying that this aspect of that great industry is so multifarious and so complicated that one scarcely knows at what point to begin. But when the fundamental points for the development of individual mines have been determined and established, the first important part in the detail must be a comparatively competent knowledge of the character of the ground to be explored, as to the resistance it may oppose to the miner's methods of attack. The value of labour is in proportion to its effects, and this is regulated in mining by the nature of the ground into which the miner has assumed to penetrate, and the proportion in which the exploratory progress stands to the amount of labour applied, determines the quality of such labour and the skill displayed therein. Experience has shown that in order to the observance of due economy in this department piece, or contract, work is the most effective.

I am glad to have an opportunity to say a word or two on this important question—I say question, because I have recently seen it submitted in the columns of the Journal in that form—as to whether day labour or the system of contracting for all work in the underground department of mining was preferable I confess my surprise at seeing that anyone in England interested in mining could entertain such an idea in the present day, and think sufficiently of it to present it for consideration to a London company of adventurers. For myself, I rebut such a proposition by positive assertions, not deeming it worthy of a single argument. And, first, the working of mines in the underground department by day labour may be justly designated a *crutch* and *stick* method, whilst its effects upon the workmen may be pertinently expressed by the maxim "Like master like man." The superiority of the Cornish miners to every other nationality is due entirely to the contract—tutwork and tribute—system, to which, and in which, they have been educated and exercised from early youth to latest age. Subvert that system, and the cost of underground mining would so increase as to reduce the profits—none too large now—to an extent which would militate, not only against the success but against the whole system of mining; and whilst no one interested would be benefited, all would, to a greater or less extent, be injured.

None but those who have travelled know to what extent mining in various parts of the world is benefited by the superior skill and qualifications of the Cornish miner to accomplish all kinds of work. I think there need be no apprehension that a system so fruitful of good, and so universally appreciated by all able workmen and their employers, will ever be abandoned in favour of a degenerating custom—too tame, monotonous, and contemptible to be called a system. But whilst its popularity, and unquestionable utility, will be sufficient to preserve it unimpared in those countries where it is established, and its benefits so manifestly experienced, prejudice—the prejudice of ignorance—may oppose its introduction into individual mining enterprises, especially in new countries, and the success of such enterprises be sacrificed entirely to and by such ignorance.

The efficient force of skilled labour, estimated in respect to the tenacity of the hardest and most troublesome rocks, and all other kinds of rocks, be they hard or soft, as to the resistance they oppose to manual force and skill, and the relative proportion of one to the other of these, form the groundwork, or basis, of calculation by both parties to such contracts, and from which the value or prices which should be paid for specific contracts are estimated and determined. It is not to be wondered at, then, that agents placed in charge of mines who are wholly inexperienced in such matters should betray diffidence, seek something comprehensible to their senses, and patronise a subterfuge. It is, therefore, safe to assume that opposition to the unqualified adoption of the contract system of developing mines will be protracted in districts where it has not yet been admitted, in proportion to the lack of practical experience comprised in the managerial head. It must, therefore, be apparent, from even such a cursory view of the subject as is here presented, that a competent knowledge of the relative proportion of labour to the amount of the effective work accomplished in the underground department of mining is an indispensable necessary qualification in the *director ate* to ensure its success with economy. I have already intimated that next in importance to the correctness and proper observance of fundamental generalities is a judicious adherence to a similar course in the details.

The nature of practical mining is necessarily obscure, and without the aid of artificial lights it cannot be prosecuted with that assurance and success its importance, apart from individual pecuniary considerations, deserve. By artificial illumination a panoramic reproduction of all that pertains to the interior of a mine is intended—viz, its lodes, its cross-courses, its slides, its elvans, &c., as well as all explorations of shafts, levels, winzes, &c., which have been prosecuted throughout the entire works, and the relation in which each of these objects stand to the other; and as these constitute the vital points upon which depend the success of most and the fate of many mines, remotely if not immediately, it, therefore, must be at once conceded that every consistent precaution ought to be exercised; and as most mines are confided generally to one responsible head as manager, his duty becomes plain in this respect, to personally investigate and test every rule, its adaptability, and the manner of its application, to diffuse light on this necessarily obscure and most important part of mining. As essential as the compass is to correct navigation so is it to practical mining; and, therefore, all agents above the grade of mere machines should be competent to undertake and execute correct surveys. I do not mean by this that professional diallers should be superseded, certainly not, but that in all cases where large sums of money are involved the parties entrusted with the making such outlay should be able not only to define the objects to which it is directed, but should be intimately conversant with every phase of its prosecution in detail, and be personally competent to practically test the accuracy of every method employed in directing the various operations to successful issue. A great deal in the sum total of multifarious mining is synonymous with principles of the arts and sciences, and derivable therefrom, but the most difficult part is that to which no abstract principles have yet been successfully applied—viz., the relation of lodes and cross-courses, and the manner in which they mutually affect and are said to displace each other. But nothing hitherto can be presented or accepted as a guide in this most difficult part of mining but art—the science of observing certain peculiar lineaments at the point of the intersections, and the reference of these for interpretation to some known standard between which and the thing referred something like analogy or contrast exists. The evidence of facts so submitted to the reason, and the dictates of its judgment determine the future process.

It has been pretended that the delineation of two intersecting veins, a metalliferous lode and a cross-course, on paper, showing the relation in which they stand to each other longitudinally, and the angle at which the intersecting vein penetrates the other, and effects, as is said, its displacement, that by a simple mechanical process of projecting a line perpendicular to the plane of the cross-course, or either vein which displaces apparently the other, an index is provided by which may be determined the direction of the missing part of the vein so displaced. But such a devise, I need say only for the information of those unacquainted with practical mining, is an absolute fiction, and if adopted and rigidly observed would lead to greater and more numerous errors than now result from following such lights as we have. I have previously stated in the columns of the Journal that abstract science is not yet sufficiently advanced to dispense with empiricism in this department of mining; and allow me now to add that when it does so it must be on principles similar to those constituting problems in geometry. From certain known facts other necessary facts are arrived at, and until that very desirable consummation arrives this important branch of mining knowledge will remain as now to the domain of art, the province of observation, and therefore continue to constitute an indispensable important part of the manager's ever-recurring duties, and, indeed, of every agent associated with such departments.

Metalliferous lodes appear to be as sensitive as living organisms and to be affected by extraneous circumstances in much the same way, and their growth and development are impeded by any interruption of the functions upon which the increase of their parts depend. There are neither reason or evidence to suppose that those parts of lodes from which the usual currents of water had been diverted, and continue to be diverted, by the operations of mining—draining the contiguous rocks and veins, and depriving the latter of their only medium of increase—that such veins ever increase in size or value, or that they ever advance a single step afterwards towards that perfection to which Nature designed and was conducting them. Of course, these remarks are not intended to apply to extremes, as many lodes are known previous to their full development to extend several miles in length, and to be intersected by several cross-courses which separate as natural claws, and divide the lodes into numerous sections, so that operations may be carried on in one or more direction, without in any way interfering with the process of Nature in either of the sections beyond.

It should also be remembered that these natural dams, or cross-courses, affect the lodes in another, much more important but widely different, sense, and that their productiveness, in some way or other, is regluated thereby. It is not unfrequently the case that the prolific character of lodes is much impaired by the occurrence of a cross-course, and *vice versa*, so that the same instrumentality, from opposite points of view, is productive of both good and evil, determined by accidental circumstances—that is to say, if by the intersecting of a cross-course from one direction a lode was found to be improved by intersecting it from the opposite side the same lode would be found correspondingly improved; so that it is imperatively necessary to a proper understanding of facts to qualify our statements concerning them.

It sometimes happens that an adverse channel of ground suddenly supervenes, unaccompanied with anything like selvages of flookan and at the same time is as rigidly distinct from the adjacent rock as though it were. Occurrences of this kind are characterised, though inexplicably, by features which are indicative of unmitigated hostility and obstruction to the lodes, which up to that point may have been exceedingly productive, but beyond not only cease to be so, but to *be* entirely during the continuance of such a channel of ground and hence a blank, a break of continuity, occurs in the lode, and continues, at least, until a change in the ground takes place.

When I concluded my last letter on this subject I thought that it would not be necessary to protract my remarks beyond the limi

of this, but somehow I have been betrayed into greater length, and now ask to be favoured with space for another communication.

Ellsworth, Nye County, Nevada. ROBT. KNAPP.

THE MOUNT DALBY MINING COMPANY.

SIR,—I do not think you are often troubled with such communications as the following, but, in the interest of justice and fair dealing, I feel sure you will, after a perusal of it, conclude that having applied in vain to the directors of this company we have no other course open to us but to lay before the public, through the *Mining Journal*, what we consider a singular case of injustice to us, in which some of the investing public may also feel interested.

The circumstances are as follows:—About two years ago a friend and myself obtained from the Crown a sett in the Isle of Man, which contains about 430 acres, extending for about 1½ mile *upon the course* of the well-known Beckwith lode of the Foxdale Company's mines, *commencing immediately at the western boundary of that company's property.* Shortly afterwards the land to the westward of our sett (divided by our sett from the Foxdale Mines, and therefore not less than 1½ mile distant from those mines) was applied for, and a lease or tack-note granted by the Crown, which lease or tack-note has now, I understand, become the property of the Mount Dalby Mining Company (Limited). Some time last month my attention was called to the fact that *the land in lease to us* was evidently *included* in the description given by this company of *their sett*, and upon obtaining one of their prospectuses, and the plan accompanying it, we found that not only was such the case but that the features upon which the greatest stress was laid belonged almost, if not entirely, to the land leased to us, in which that company had no interest.

Wishing to believe that the directors were unaware of, and would gladly avail themselves of an opportunity to remedy to the best of their power, the wrong done us, I at once wrote to each of them, setting out the facts, and asking their immediate attention to our complaint. The statements of which we complain are totally at variance with the facts, as you will see at a glance on reference to the plan and prospectus in question, and are briefly these:—

1.—The most prominent feature stated in the prospectus and reports with regard to the sett belonging to the Mount Dalby Company is that it is near, close to, and a short distance from the sister mine, the justly celebrated Beckwith. *In the plan* the Beckwith Mines are coloured red, as is also the lode running westward for about two miles from these mines to the sea, but there is nothing whatever in the plan to indicate that any portion of the ground through which that lode runs is owned by any one but this company. Is this consistent with the fact that about 1½ out of 2 miles of this very land does not belong to the company, but separates the company's land from the Beckwith Mines?

2.—The prospectus states that the company has been established for acquiring and working that extensive grant of highly metalliferous ground known as the Dalby Mountain; and the plan has the words Dalby Mountain conspicuously printed *within an inch from the boundary of the Foxdale Mines.* Is this consistent with the fact that the land on which these words are printed is the portion of *our* sett which is furthest *from* the Mount Dalby Company's property, but nearest *to* the Beckwith Mines?

3.—The plan is stated to be on a scale of "six inches to a mile," and the whole distance shown from the Beckwith Mines to the sea is barely 11 inches, or considerably less than two miles, of which they claim "nearly two miles." Is this consistent with the fact that more than 1½ mile of this ground separates what remains to them from the Beckwith Mines, and never did belong to their company at all?

I think these facts will be sufficient to satisfy you that our complaint is only too well founded.

In reply to my letters to the directors I received notes from some of them, and from the secretary, expressing surprise, and promising that the matter should have immediate attention, upon which I suggested to the secretary the propriety of his coming to Liverpool, so that we could explain to him any points which might enable his directors to arrive at a proper decision as to their future course. This he "with pleasure" accepted, and at the time fixed a gentleman, who introduced himself as "Mr. Grosvenor, the company's broker," called upon me; with him I fully entered into particulars, and found to my surprise *that he was as well, if not better, acquainted with our boundaries than myself*, and we parted with a distinct understanding as to the *amende honorable* being made by the directors at their meeting on the following day. Instead of this, however, we received an official letter from the solicitors of the company, stating that "their clients had not the remotest intention of leading the public to believe that their property adjoined or was close to the Beckwith Mine;" and with respect to the plan, "it is altogether a mistake to suppose that our clients claim anything whatever upon it." How can this be reconciled with their prospectus; and what is the object of prospectuses and plans if not "to lead the public" to believe they represent the property offered them for investment?

If this were a matter of trifling import we should certainly not have troubled you or your readers with our complaint; but we have already found that negociations in which we were engaged regarding our own sett have been seriously interfered with, if not entirely broken off, from no other cause, as we believe, than this apparent claim by the Mount Dalby Company, and we feel that if we passed over the present state of affairs without protest we would suffer further wrong, because, should our property at any time be offered to the public they would no doubt think that it already belonged to another company, and that instead of being the rightful owners of it we were endeavouring to trade on our neighbours' property and reputation. I have endeavoured to abstain from importing any "feeling" into this letter, but to submit as simply and truthfully as possible the plain facts on which we wish the public and yourself to form a right judgment. WILLIAM C. BEW.

Colonial-buildings, 36, Dale-street, Liverpool, May 22.

MINING IN IRELAND—GLANDORE MINES.

SIR,—Referring to the letter of Mr. King, in the Supplement to last week's Journal, I beg to say this property was visited by Mr. King prior to the existence of the Glandore Mining Company (Limited), on which occasion the representations made by me I still maintain, and no information was withheld that I was at liberty to communicate.—*Glandore, May 21.* THOMAS TONKIN.

DEVON GREAT CONSOLS MINING COMPANY.

[The following letter is from Mr. Josiah H. HITCHINS, and was intended for a shareholder, but not being in time for its intended use he has requested its publication in the *Mining Journal*.]

SIR,—The following remarks, written by me in bed, to which I am confined by a broken leg, I leave you to decide whether desirable or not for your momentous meeting of to-morrow, in the main decision of which I feel not a little interested. I have very carefully read the reports of Capts. Thomas, Simmons, and Richards, in which they have well considered the important question whether the lode in these mines, which has become comparatively poor for copper, is likely to prove productive for tin. Their views and opinions are too strongly supported by parallel cases—in other words, too firmly established on the safe ground of analogy—to allow of any doubt as to the soundness of them. I allude to the comparison of these mines with some of those in Cornwall, once rich in copper, now producing, it may almost be said, tin exclusively; their similarity of position in relation to the granite and killas, as well as in other important respects (the same clearly observable altered character of the lodes in passing from copper to tin, &c.) being very satisfactorily explained. Of such mines there are many, as is well known; so many, indeed, as to establish the rule that such a change is to be reliably expected under the several conditions mentioned in the reports to be referred to, particularly in mines of great power, not in the killas too far from the granite, or *vice versa*. Although in these reports the great problem now engaging the attention of many, like yourself, deeply interested in its solution, has had enough of conclusive reasoning brought to bear on it to give the firmest support to the opinion that the Devon Great Consols will, on deeper development, be great tin-producing mines, I cannot remain silent as regards a fact too important to be left unnoticed. I refer to the New Great Consols Mine, about two miles to the west, on one of the portions of the Devon Great Consols lode, in killas a mile from the granite. I well remember its being worked many years for copper, under the name of Wheal Martha, but it is now essentially a tin mine. It has produced many thousands of tons of copper, but its power as compared with the Devon Great Consols is only to be considered very limited. The lode, however, is producing 20 tons of tin a month. May it not, therefore, be reasonably expected that such extensive mines as the Devon Great Consols, with a greatly superior power, will yield many times that quantity when fairly in the tin ground, in which the present workings (the deepest) it is clearly to be seen soon will be; the upper portion, or that is to say the beginning of the transformation ground (so to speak), having bren already reached.

That the Devon Great Consols will add to the many tin mines once rich for copper above the ground now paying large dividends on tin has been for some time my conviction, which has been greatly strengthened by the reports of Capts. Thomas, Simmons, and Richards, well-known mining authorities, possessing such sound practical judgement as is only to be acquired by long and varied experience. It is not, however, my opinion that the realisation of the change in Devon Great Consols from the rich copper mines they have been to very productive tin mines will require either such depth of development, or such a large expenditure of money, as talked of, which is only meant as a maximum, to make sure of being within the mark, and escape the fault-finding of short estimates. In the reports referred to it is stated that the Devon Great Consols lode "resembles in several important particulars the main lode of Carn Brea, Tincroft, Cook's Kitchen, and Dolcoath Mines, which are producing immense quantities of tin at depths of from 200 to 330 fms.;" also that "this lode, like the Devon Great Consols, is in killas, with the granite on the south, to which it underlies, both lodes having been very rich for copper above the present workings on them; their altered composition and appearance below the copper being very similar, making at first quantities of fluor-spar, and at deeper points hard quartz and chlorite, with arsenical pyrites and a little tin." These particulars establish a fully satisfactory case of parallelism between the great Cornish mines mentioned and the Devon Great Consols—that is to say, as regards their mineral and chemical modifications of character in changing from copper to tin, which may be considered the groundwork of the whole case.

Likely enough, therefore (only fairly arguing on such data), that by the time, or before, the workings are 20 fms. deeper there will be such a decided change in the lode as to establish beyond a doubt the opinions of Captains Thomas, Simmons, Richards, and myself, that the Devon Great Consols are to be productive tin mines.

It also is a fact that already "samples are to be broken in various parts of these mines, all containing tin in greater or lesser quantities, the lode being generally of great size and strength; and it is particularly worthy of notice that "at the bottom of Richards's shaft (the deepest point of development) the lode is fully 10 feet wide, strong, promising, and containing tin throughout."

The sinking of this shaft (235 fathoms deep) is, therefore, well advised, being the nearest to the granite on the south, with the lode underlying towards it, as before stated, which is undoubtedly much in favour of its proving productive. It is additionally in favour that there is (as stated in Capt. Richards's report) "a lode underlying north bearing tin, which will probably fall in with the main lode some few fathoms below Richards's shaft:" moreover, he says, "the geological conditions are remarkably similar to those of the Camborne district." These and other important points to which he directs attention (evidencing a sound judgment) more and more encourage the belief that there will be found a large body of tin under the present workings.

Taking all the circumstances into account, it is in my opinion an unavoidable conclusion that these mines are to be great tin mines. Indeed, it is to be asked how it can be otherwise, looking at the many strikingly parallel cases that there are besides those cited. I cannot conclude these few hasty remarks without saying that the reports of Capts. Thomas, Simmons, and Richards reflect great credit on them, not overlooking any point entitled to weight in coming to a decision on this important case. On a careful perusal of them it will be readily believed that there is yet in store in these mines great mineral wealth, which will prevent many from allowing their shares to pass into the hands of others, at a price too much below their intrinsic value. They must be read *in extenso* to fully understand the soundness of the evidence and reasoning on which their important conclusions are based, the few extracts that I have made falling very far short of doing such able documents justice.—*Montpelier-street, Brompton-road, May 13.* J. H. HITCHINS.

MINING IN NORTH CARDIGANSHIRE.

SIR,—Whilst passing through this part of the county I gleaned some information respecting the position and prospects of lead mining in the district which might not prove uninteresting to the readers of your valuable Journal. I shall commence with—

ALLT-Y-CRIB.—This mine is situated in the village of Talybont, and seven miles from the seaport of Aberystwith, and is being worked by means of an adit level driven into the mountain in a north-west direction from the River Caylan, and is in length several hundreds of fathoms upon that line; and a communication is effected with different lodes, and a substantial tramroad laid down for conveyance of materials, &c., to the dressing-floor, which is erected close to the entrance of the adit level referred to. The stratum is a clay-slate formation, congenial for silver-lead ore. The lodes vary in thickness from 3 to 8 feet, and at times contain ribs of solid lead ore, from 3 to 12 in. wide, yielding from 1 to 4 tons lead ore per fathom, and, on the whole, the prospects of this mine are very encouraging.

NORTH ALLT-Y-CRIB.—This property is situated on the north slope of Allt-y-Crib hill. The principal vein in this grant is a north and south cross-course, with feeders, or small branches, running at right angles, making short bunches or pockets of ore against the cross-course, and unless new veins are discovered the probability is that this mine will never become profitable. The present manager is Mr. John Williams, formerly of Messrs. Nichols, Williams, and Co., iron foundry, Tavistock.

ERGLODD AND PENPOMPREN.—The work that has been done here by the present adventurers is of a very limited character, being devoted principally to the driving of Hobson's adit level; however, from all appearance, they have been fully rewarded, and a finer course of ore now in the forebreast of that level cannot be seen in any mine in the Principality. I will here remark that the whole drivage has been conducted in a miner-like manner, showing great judgment on the part of the company.

DOLCLETTWR.—This mine is owned by Mr. Richard Gibbs, of London. It is situated in the village of Taliesin, half-way between Aberystwith and Machynlleth. There are two lodes traversing this property, one a lead lode, and the other producing rich yellow copper. A sample of about 20 tons was sent to market a few days ago; it realised from 12*l.* to 13*l.* per ton, and there is another parcel of about the same quality in course of dressing. The present depth of the mine is 20 fms. under adit.

BRYNARIAN AND PENSARN.—These mines are now in the hands of a fourth company, and all within the last 15 years, the first being Joseph, Aaron, Joseph, and Co., of London, who lost 10,000*l.* in the concern; the second, Messrs. Waddington, of the firm of Bray and Waddington, of Leeds, they lost 6000*l.*; and the third being Silk and Co., of London, who lost 5000*l.*; total loss being 21,000*l.* The present company are Messrs. Sadler, Elwes, Bluett, and Co. The appearance of the mine where it is worked is very poor. They have sold within the last fortnight 13 tons of blende ore from Pensarn north and south lode. But no one as yet can predict what the result to the present company may be.

ESGAIR-HIR AND ESGAIR-FRAITH.—These mines are now being worked by a limited company under the above name. Doubtless all the readers of the *Mining Journal* have read from time to time respecting the great value of these mines. I shall now endeavour to give them a correct account of the actual results obtained by the three last companies who worked the property during a radius of 30 years. The first company who worked the mine under the above name were Messrs. Williams, Eaton, and Co., Flinishire, who lost 10,000*l.*; the second company were Messrs. Wilkinson, Dickson, Williams, and Co., London, worked under the name of Welsh Potosi, and lost 150,000*l.*; the third company were Messrs. Murchison, Pittar, and Co., London, worked under the title of the Cardganshire Consols Mining Company; they lost about 12,000*l.*: total loss within last 30 years, 172,000*l.* The fourth and present company are Messrs. Gibbs, Reynolds, Firebrace, Whitney, Armstrong, and Co., of London. The above company have already laid out about 10,000*l.* in machinery and draining the mines, including a steam-engine, boring machine for sinking, &c., and a further sum of 5000*l.* has been subscribed in order to develope the mine at a greater depth.—*May 23.* VERITAS IN FONTE.

[*To be continued.*]

LEAD MINING IN SHROPSHIRE.

SIR,—With your permission, I would like to remove any wrong impression likely to accrue from the remarks of Mr. Cavendish Tahourdin in last week's Journal, under the above heading. Writing on the Bog Mine, the public would reasonably be led to believe there is still 130 fms. of water in the shaft, whereas there is only about 42 fms. from the present water to the bottom of the mine. Mr. Tahourdin also says "It is feared that before long more capital will be needed." In this he is also in error; there being only about 42 fms. to clear to reach the bottom of the mine. The funds are supposed to be sufficient for that purpose; besides in the lower levels there are courses of lead left, by which the returns will be increased so as to meet the cost, and eventually leave very handsome profits; and if Mr. Tahourdin is disposed to invest, I know of no mine more deserving of his confidence. T. W.

WHEAL PEEVOR, AND ITS MANAGEMENT.

SIR,—As a private communication with the officials of this mine has failed to produce the desired result, I beg to avail myself of the opportunity to ask them, through the medium of your valuable paper, why it is that a report never appears in the columns of the *Mining Journal?* I cannot imagine the reason that outside adventurers are kept in such ignorance. Like many others, I have been since told, I was persuaded to become a shareholder, on the faith that it was Treleigh Wood lode now being worked on, but my shares have declined in value about 50 per cent. in so short a time that I left London a few days ago for Cornwall, with a view to obtain some information on the subject, and I am much mortified to find that, after having heard various opinions, they all acquiesce that Treleigh Wood lode does not pass into, or even go near, our Peevor property. Having been told all sorts of things as to the staff of officials that are engaged here, &c., I think it will not be altogether out of place to give a sketch of a respectable man's views, as expressed openly the other evening, in the presence of many parties, at the hotel that I am at present stopping at. I do this the more readily as their publication will afford the opportunity for those concerned rendering any explanation they may consider desirable or necessary. It was as follows:—Capt. T.: They say they have a good mine at Peevor now, at above adit. Now, how can it be, when not long ago the mine was drained by Great North Downs to the 40, and its greatest depth is only 60 fms.? Even then very little tin could be raised. Peevor was then a part of North Downs Mine.—Mr. M.: But tin has risen 40*l.* per ton since then, captain. —Capt. T.: Will that make a mine the richer that could scarcely return any tin before the rise? Then, again, who would have shares where the purser and engineer are wholesale dealers in mine materials, and are privileged, if they were so disposed, to supply their own mines at their own prices?—Mr. M.: No such a thing as that is allowed in your Cornish mines, is there?

Now, other remarks quite equal in magnitude, to my great surprise, dropped from the lips of this, a much respected, captain. I protest and contend that if such actions as these are perpetrated by those holding the positions of respectable pursers a deplorable result must inevitably sooner or later evince the consequences; but my greatest astonishment is how someone has not apprised the mining community of such practices before this, for your widely-circulated Journal has, and very creditably so too, the reputation for administering justice, which in a paper cannot be more satisfactory to ignorant mining investors. Thanks be, things are conducted widely different at the Treleigh Wood Mine, where I am, unfortunately, only the holder of a few shares. From enquiries I find this mine certainly more than an ordinary speculation, and after a visit to it, having made an extensive investigation, I beg to congratulate my fellow-shareholders, for few people know what it has done in times past. If you will kindly insert the above you will confer a kindness on outside shareholders, and much oblige— A PHILANTHROPIST.

Truro, May 14.

TERRAS TIN MINING COMPANY.

SIR,—I noticed in last week's Journal a report on this mine by Capt. Edmund Rogers, of Wheal Agar, and headed "Special." In one sense it is special, being a regular "bearing" report, and got up for no other purpose than to depreciate the property, and to put down the price of the shares. The parties for whom Capt. Rogers reported, I am credibly informed, had not one farthing of money interest in the property, simply a bargain for the delivery of shares; and finding that they could not be obtained in the open market, nor from private individuals, they had resource to very questionable means of getting an order for their "bearing" agent to visit the mine. Besides, it is evident that no sane man having a property would publicly defame it in the *Mining Journal*, and then turn round and offer it for sale. Their object and intent, therefore, is too obvious to need further comment: and it is much to be deplored that a man of Capt. Rogers's position and standing as a responsible agent (or supposed to be) should lend himself for such improper, and I may add unlawful, purposes. So far as Terras was concerned, its position was predetermined; Capt. Rogers had a purpose to serve, and he faithfully adhered to his mission.

Capt. Rogers makes the average produce of the stuff from the elvans lo be 8 lbs. of tin to the ton, and says this can never pay, even with the greatest economy. I beg to correct Capt. Rogers in this particular, and to further inform him of his ignorance on the subject of open workings, and will refer him to the Great Polgooth Mine, near St. Austell, open workings; stuff reduced by steam-power at an average of not exceeding 5 lbs. of tin to the ton, and they are making excellent profits. Another, the Mulberry Mine, Lanivet, near Bodmin, working by steam-power, at an average produce of about 6 lbs. to the ton: Mennear Down, near St. Austell, and many others, all making good profits at the above average produce of tin.

The produce of the Terras elvans as given by Capt. Rogers is 8 lbs. to the ton, thereby giving it a decided superiority over all the others; and as regards the quantity, it is unquestionable, and this Capt. Rogers himself admits. Then, what is to hinder Terras from doing what other concerns under similar circumstances are doing? and that, too, with a higher class of stuff. I am prepared to tell Capt. Rogers, or any other man, that if the lodes in Terras are found not to contain one particle of tin, the elvans alone are such as to constitute it a good and lasting property; on the contrary, the lodes are found to produce a high percentage of tin, and will in a very short time speak for themselves.

Capt. Rogers also says that we are working at a loss of some 250*l.* per month. In this Capt. Rogers is without excuse; and fearing he might inadvertently commit an error on this point, I wrote him a letter explaining the whole matter, and to say that the contractor undertook to put up all the necessary plant and machinery, and to do certain other work. The cost of the getting of tin has been strictly adhered to, and the profits on such getting have gone to the shareholders by way of dividends.

I am astonished at Capt. Rogers' ignorance when he says that the lode in the 30, at Edwards's, is composed chiefly of iron, with a little tin, evidently showing that he does not know the difference between ironstone and tinstone,—for the stones which he takes to be chiefly iron are really tin of high quality, containing from 50 to 70 per cent of tin. On the whole, I would advise Capt. Rogers to look to Wheal Agar, where fully 50,000*l.* has been spent in deep mining, for which amount I have been informed, up to present time, a very small quantity of tin has been sold. Surely if his advice were ever needed it is to the losers of the said 50,000*l.*, and if honestly given (if honesty forms a part of the composition) it would be deemed a virtue even at this stage of the proceedings.

In conclusion, I beg to say that Capt. Rogers was only on the mine about two hours and a-half, and as the property extends over an area of upwards of a mile, two-thirds of which he never saw, how comes he then to pronounce judgment upon that which he had never seen? It is not pleasant to have to use uncourteous or strong language, but the conduct of Capt. Rogers deserves the severest reprobation. *May 22.* MARTIN RICKARD.

EAST LLANGYNOG MINE REPORT.

SIR,—I beg your further permission to insert a few remarks upon the report in question, which I omitted in my letter that appeared in the Supplement to the Journal of May 11. In May, 1871, I dressed and sold over 40 tons of lead ore, all dressed by hand labour, crushing only done by machinery; and at the time of my leaving the mine, in August last, there were on the surface the following quantities:—Of solid ore in a pile near the mouth of No. 1 level a quantity which I judged to be 15 tons; but Mr. Pascoe, in reply to a question put by Mr. Taylor as to the quantity, judged there might be 12 or 13 tons; 2 tons of ragging, and a pile of hutch-work, which would produce 2 tons more; also about 100 tons of spalled and pick-work on the dressing-floor, under the dressing of Mr. Pascoe, which, supposing the same to yield 2 tons of lead in 20, which is the lowest usual estimate for poor stuff, would give 10 tons of pure ore; these quantities would give at least 27 tons of clean lead. The Chairman's remarks, and the directors' report, apparently designedly, keep very clear of doing justice to me, but give all the credit for all the success which they claim done at the mine to the present agent. Such unfair onesideness on the part of officials of a company should not be allowed to pass, as the plans for development of the mine are not theirs, but my own; and the statement made by the Chairman to the effect that Capt. Pascoe had erected the dressing-jiggers and crusher without the aid of an engineer is entirely incorrect. Should the shareholders feel disposed to look into the cost-book of the company, they will find an entry for expenses of Mr. Thomas, engineer, from Llanidloes, for journeys to the mine in the erection of the crusher and jiggers. Such an entry, however, should exist in the book, as Mr. Pascoe, then a dresser at the mine, was sent by Mr. Taylor to Mr. Thomas to consult with him about their erection. In addition to the suggestions previously made by me in reference to the shallowness of the report, I will add one or two other important ones. Why when the agent stated in his report that the lode was cut in No. 4 level south was it not stated what it was like—whether there was any lead ore there, what was the lode composed of, and its size? The same remarks will apply to the lode in the deep adit. Again, as to the cost in driving an end only 9 ft. above the No. 1 level west, which cost in driving 6*l.* 10*s.* per fathom, when the ground should have been stoped from the back of No. 1 level: the cost would not exceed 55*s.* per fathom.

So much for practical mining and judgment in letting of work. I am not surprised there is no dividend declared. For my own part, individually, I look upon the two reports as one piece of badly spoiled Manchester cookery; and why I persuade myself it is so is because attempts were made there upon my reports to tamper with them, which I uniformly stoutly refused to allow to be done. As my connection with the mining interests is of many years standing, and well established, I should advise the shareholders to have the mine thoroughly inspected by a practical mining agent of experience and of confidence, and no ways connected with the directory and the management. E. J. BURN.

London, May 23.

GREAT NORTH DOWNS MINE.

SIR,—Since I wrote you the few lines respecting Great North Downs Mine, inserted in last week's Journal, a friend has informed me that I was in error in stating that Mr. Wm. Michell, of Cornhill, was the secretary of the mine. He is merely a promoter of and a large shareholder in it. Being in possession of a large amount of information which will, probably, be interesting to the company, and which I have not now leisure to copy, I intend to send it to you for insertion in next week's Journal.—*Truro, May 23.* R. SYMONS.

VIRTUOUS LADY—QUEEN—AND KING MINES.

SIR,—The public at large are quite familiar with the depressed state of the finances of the committee for the restoration or beautifying of St. Pauls. We are much indebted to a gentleman residing in Palmerston-buildings, London, for a "happy thought" in a little tract extensively circulated by him—"and men of science can, by inspecting these works, prove that my words are correct when I state that England is teeming with wealth, hitherto hidden or unknown—in fact, it only wants the will and capital to set hundreds of places at work. The same as the King and Queen Mines, and silver can be extracted and sold by the ton. Yes, silver by the solid ton! There is enough of it now in England's mines lying to waste, and being daily and yearly passed over and thrown on one side as useless, that would line the streets of London with silver, or make one solid block of the precious metal as large as St. Paul's Cathedral. It is a real truth—a ton of silver—how towering it seems."

The writer has been in the ball on the top af St. Paul's, and he found it very "towering" to get there; but this "towering" seems to sink into the most contemptible insignificance, beside the "solid block of the precious silver metal as large as St. Paul's." No need now, Sir, to go to Peru for silver—nay, the value of California, the Emma Mine, and the diamond fields of Africa and gold mines of Australia sink into insignificance by the solid block of precious silver metal as large as St. Paul's Cathedral. I am not quite prepared to state the exact number of sixpences that might be made out of this solid block of precious silver metal as large as St. Paul's Cathedral thrown on one side as useless. The happy thought is, if we could only get a few millions—say, a billion—just to commence with, of the block of solid silver now thrown on one side as useless, this billion of sixpences might, perhaps, be judiciously distributed as follows:—A few millions to the completion of St. Pauls, and relieve the executive of the trouble of begging contributions; a few millions more to pay a little off the National Debt; a few millions more to settle our account with Brother Jonathan's Alabama claims; a few millions to Mr. Lowe, the Chancellor of the Exchequer, for the reduction of the income tax; a few millions to buy coals for the Queen Mine; a few millions to the Stannaries Court, to release the King Mine. The Virtuous Lady Mine will, with its returns of tin and copper, work itself, or nearly so; therefore, a few millions will not be required here, for the secretary of the Virtuous Lady Mine says—"And the dividends of 20,000*l.* per annum that I predicted will yet come to pass." Just by the way, why not add three more ciphers, and say 20,000,000*l.* per annum, for this can only be a small matter besides the solid block of precious silver metal as large as St. Paul's Cathedral. I think, Sir, the remaining few millions out of the billion of sixpences might be handed over to Palmerston-buildings, Old Broad-street.

So much for an introduction, but why "cry over spilled milk." It appears the King Mine is quite safe in the hands of the Stannaries Court. "It is of no use crying over spilled milk," so says the secretary of the King Mine; "and as regards the Queen Mine, the debts are 1250*l.*; calls yet to come in, not due, including my own, some 200*l.* My liability is some 1400*l.*," so says the secretary of the Queen Mine, but "it is of no use crying over spilled milk." "It is most likely that arguments will arise that the three mines have nothing to do with each other. Let me explain," so says the secretary of the Virtuous Lady Mine, but "it is of no use crying over spilled milk." "I have from first to last made myself liable to some 6000*l.* Queen, 2000*l.* King, 4000*l.* Virtuous Lady, equal to 12,000*l.*, and all would have been well, and the amounts paid in full ere now, if the mines had turned out profitable. As it is, I am liable, or have made promises to pay yet some 4000*l.*" "It is of no use crying over spilled milk," so says the secretary of the Queen, King, and Virtuous Lady Mines.

Now, Sir, I am a shareholder of the Virtuous Lady Mine. I paid 2*l.* for every 1*l.* share I hold, and a great many more shareholders did the same, so I understand. The prospectus of the Virtuous Lady Mine states—"Capital 15,000*l.*, in 15,000 (1*l.*) fully paid up shares;" therefore, there is no further liability, especially to the shareholders who paid 2*l.* for 1*l.* shares. What I have got to say is this—Let the shareholders of the Virtuous Lady Mine look out after their own interest; let the Queen and King do the same, but let us have no more of this three in one and one in three. Let each of the companies have their own secretary, for why should the Virtuous Lady be dragged into the mire with the other mines? Let the secretary have his "downfall" if he cannot stand up, but let the shareholders take care that he does not pull down the Virtuous Lady; and if the other mines (Queen and King) are going to the dogs, let them go. What have the shareholders of the Virtuous Lady to do with them? The Virtuous Lady Mine is distinct to itself; mind it is kept so. Let us have no more nonsense; let us have no more humbug; let us have a secretary to ourselves, for how can a secretary who is over head and ears in debt in other companies pay proper attention to the Virtuous Lady interests? If "the Virtuous Lady will, with its returns of tin and copper, work itself," mind the other mines work themselves. Let us have no more of the nauseous nonsense of "block of silver as big as St. Pauls," nor "solid rocks of copper." Let the shareholders put their foot on this matter, and if the secretary does not like it, let him "cry over spilled milk."—*Manchester.* A CENT. PER CENT. SHAREHOLDER.

PINTO MINES, AND THEIR MANAGEMENT.

SIR,—I have looked every week in the Journal for a long period in the hope of finding some information respecting these mines, but have found nothing, with the exception of about five or six lines a month ago, saying that in consequence of the bad state of the roads no ore could be conveyed to the mills; but surely that is no reason why the shareholders should be kept so long in the dark as to the position of the company's affairs. There has been no published report as to the quantity of ore which has been crushed, or how much is waiting to be crushed, what operations are going on at the mines, or, in fact, on any other point whatever. Surely the roads are open now; if so, why no telegram? The company has, I believe, received some $10,000; what has become of these? Other mines have recovered from the disastrous weather and paid dividends, and kept their shareholders well posted in all details relating to their property; why not Pinto? It is, I think, high time that those who have the management of this company should bestir themselves and shake off the torpor which appears to have paralised them, and should show a little energy, if not the shareholders will soon see the necessity of placing the affairs of the company in other and more competent hands. EXPECTANS.

Throgmorton-street, May 22.

TAQUARIL MINING COMPANY.

SIR,—Next month the annual meeting of this mine falls due, and it is already apparent that the directors' report will be of the dismal order. The mine has been explored, and resulted in disappointment. The company has been in existence five years, and last year's experience is the worst of all. The last 4s. per share of the capital has been called up, and if all paid will bring in something near 20,000*l.* To this may be added about 1200*l.*, the produce of the mines, and this is all the fund from which current expenses have to be met. In 1870 and 1871 the expenditure was 26,844*l.*, chiefly derived from calls, but in the last year a greater economy will probably have been enforced, and it is to be hoped less has been spent than before. At the best, however, the prospects are discouraging. The yield has decreased, having been 4906 oits. against 7789 in the previous year, and the money value about 2100*l.* against 3351*l.* With such a result the shareholders must inevitably be brought easy matter to decide. If the mines have been well managed and worked throughout they ought to be abandoned. If, however, any change of system may promise different results there would be room for further trial, though the prospects are shadowy. The mines are bunchy, and very unequal.

The produce of the first six months of the past year was reported as 2028 oits., or an average of 338 per month. In the last six months 2878 oits. have been returned, an average of 479½ per month. In other words, there is 2240*l.*, or thereabouts, spent to obtain 204*l.* every month. The yield must be increased more than tenfold, and sustained constantly at that to pay expenses. There seems to be no chance of such a change. If every ton of stuff treated has cost the shareholders

£. they have obtained from 2s. 10d. to 12s. 9d. in return for the bulk of about 4800 tons, but in April about half a ton yielded at the rate of 57£. 12s.; in October another half ton at the rate of 85£.; in November one ton at the rate of 135£. 11s. 6d.; and in December half a ton at 122£. 8s. These large yields are too fitful to depend upon, and it is by the bulk the shareholders should reckon the value of their property. In such a position it is to be hoped that some such arrangement as was made in the case of the South Aurora may be practicable by an appeal to the vendor for a substantial contribution. The mine must have been sadly over-valued, as the reports on which the purchase was founded have all turned out illusory. The 100,000£. contributed by the shareholders must be looked upon as gone.

COPPER.

[For remainder of Original Correspondence see to-day's Journal.]

Royal School of Mines, Jermyn Street.

[FROM NOTES BY OUR OWN REPORTER.]

LECTURE XXXVIII.—I have already mentioned (said Mr. SMYTH) that in working out stratified deposits it is usual to drive out three levels from the bottom of the shaft—a water level, the road level or rolley-way, and the return air-way—remarking that it would be improper to trust to the first for ventilating purposes in heavily watered districts, as it might be choked up if there should be an unusual flow of water, and so a third level is rendered necessary; and this brings us to the consideration of several points of importance in driving these side levels. In former days these levels were placed as horizontally as possible, and carried carefully between the roof and the floor, following the undulations of the stratification. As a common rule the inclination of the floors was about 3-16th of an inch to the yard—a gradient which would admit of the easy conveyance of the material along the tramways by horse-power. But it might happen, and frequently did happen, that in a pair of drifts the inclination would have to be considerably varied. In some cases the drifts used to be extremely irregular, and especially was that apt to be the case where faulty ground was met with. In such cases a disposition is now common to cut off the angles, and this because above all things it is advisable to have a good and efficient roadway, which cannot be secured if all the angles are to be followed. Sometimes a fault will cut the bed, and then the question arises as to whether it is wiser to go upwards or downwards after it. I have already mentioned the rule by which this is determined; but supposing the fault is a downthrow, and the coal is discovered, is there nothing to be done but to put in a stone drift, which is very expensive? This may be avoided by turning the level, but it is not always the best course when faults are frequent. Thus, if we turn the level to the left hand till we meet with the coal, and go on, we may come to another fault, and find the coal cut off again. We must then turn the level again to the deep side, doing exactly opposite to what we did before, and than go on the former line. If this had to be repeated frequently it would be a serious matter, and some arrangement should be made between the lord and the lessee as to tracts which by reason of faults are actually without any coal at all. Now-a-days, more frequently than formerly, the roads are cut across the fault, in spite of its being a stone drift, as it is a great thing to have a road which neither falls nor rises beyond the proper gradient. As an example, I may point out what occurs in the Ten-yard Seam of Staffordshire, with respect to what is called the Gate-road Fault, which at various points is passed through at the level of the roadways.

Assuming that the manner of driving the levels is fully understood, and that the main roads may be two, three, or four in number, according to circumstances, we will now pass to the consideration of the mode of working called "post and stall," and also "bord and pillar," the openings in which the coal is being wrought being the bords or stalls, and the intervals between the posts or pillars. Similar workings are called "stoop and room" in Scotland; in Germany, "pfeiler," or pillar;" and in France, "pilier." Supposing, then, that we start to get out the whole thickness of the bed, we cannot have a better case for illustration than that of the great Cleveland iron ore workings. A certain width is found capable, without difficulty, of supporting itself—say, about 4 yards—and, the workings being pushed on to that extent, a second stall or bord is opened at some distance from the first, care being taken not to have them too near, so as to cause a fall of roof, and so on. According to the condition of the material to be worked, the pillars left may be larger or smaller; but there are abundant cases in which the pillars must be left enormously larger as compared with others. In the Cleveland workings two or three stalls being worked out, and the pillars being left to swell, they begin after a short time to show signs of "thrust" and "creep." In Lyell's "Elementary Geology" there are some excellent diagrams, showing how destructive are the effects of "creep" in a given seam, and the destructive effects produced on the strata below to a depth of many yards, with its great effects upon the future working of subjacent beds of coal. Starting on this simple principle of bords, the question next arises of how far we can drive without cross-cuts for ventilation—and this may be, perhaps, 20 yards. An intersecting passage being cut through to the next level, the effect will be to divide the seam into a series of rectangular blocks. The cross-cuts, of course, are not so wide as the roadways, their purpose being merely to establish currents of air for ventilation. If any student visits the Silurian limestone deposits of Dudley he will see a magnificent range of pillar working, locally known as "The Caverns;" in which, from the strength of the rock, the quantities extracted were extremely large in comparison with the size of the pillars. The result is that the pillars are only about 18 ft. by 24 ft., while the chambers are 48 ft. by 48 ft.. Another very remarkable example of this kind is that of the salt mines in Cheshire, where the rock-salt of the district is so thoroughly and uniformly strong as to enable the miners to open out extensive workings, on pillars which occupy but a very small area in comparison. The work is divided by a series of "bays" or "stalls," with pillars of 8 yards square, the intermediate spaces being from 25 yards to 35 yards, the pillars remaining perfectly sound. This furnishes a surprising contrast to the workings in ironstone and coal, where by far the larger proportion has to be left as a support for the roof. There are also some remarkable underground chambers at the Festiniog slate quarries, where the general width of the stalls is 45 ft., and in some cases 60 ft., the pillars being of nearly the same width. In coal districts, however, such gigantic dimensions are impossible; and there is a great variety of circumstances for a manager to take into consideration, and carefully weigh, before he can satisfy himself what mode of working and what proportions can be adopted with the greatest amount of success.

The present system in the Cleveland district is to leave large pillars, as much as 22 yards in length by 6 yards in breadth, the bords between them being from 2 yards to 5 yards across. This was the idea when people first started coal mining in the North of England, and in several European districts proportions like these are to be met with. The levels there are 28 to 30 yards across, and bords are made by driving a new opening, and then, beyond that, opening it out on each side, until there is only about 3 feet at the sides between each bord. In a very short time the thrust and creep causes the bords to become a heap of ruins, and large tracts of coal are injured or destroyed. In some of the shallow collieries in Europe this plan is still adopted, leaving, however, alternately pillars 8 yards in thickness. At the present day it has been found desirable to leave pillars 20 to 30 yards in length, and 16 or 20 yards, or even 25 yards, in width. Some years ago, in the Whitehaven districts, pillars 8 yards square were left, but the creep came, and the pillars were much broken, and produced too much small coal. Perhaps a third or a fourth part of the coal was got out in the first working, but practically nothing of what remained was worth working at all. Pillars now are 20 yards square, or more, and generally stand so well as to be found uninjured, and to render it possible to remove the pillars, so that in this way the larger portion of the sum total of the coal is obtained. In the Monkwearmouth Colliery, Durham, which is 300 fms. deep, it is found necessary to carry the pillars 24 by 18 yards square, and 40 by 50 yards where the colliery passes under the sea. At another great colliery in that district the pillars are 40 yards square, and, therefore, at first only a third of the coal is extracted, and then how much is got by the second working depends upon the skill of the operators employed, and the amount of injury the coal has sustained from the great pressure upon it. At the Rosebridge Colliery, near Wigan, now the deepest in England, being more than 800 yards from the surface, a similar plan is adopted, but at these great depths the working is much more expensive than at 500 or 600 yards; and in these deep workings it has been found necessary to modify the size of the pillars. In 1795 Mr. Thomas Barnes, an eminent viewer in his day, originated the idea of getting the pillars. At that time much more than half the coal was lost, and the proposition to get the pillars, although deemed impracticable by many practical men, attracted much attention. It was attempted by taking part of each pillar alternately, and the quantity of coal won was increased from 39 to 54 per cent. in that district. Modern improvements gradually increased the proportion to 80 per cent., but the greatest improvement was that of panel working, introduced by Mr. Buddle, which, by dividing the area into compartments, and then systematically attacking the pillars, it was found possible to extract the greater part of the coal—say, 98 per cent. These panels are separated from each other by ribs or "borders" of coal, 60 yards or 70 yards thick, and so a colliery is divided into half a dozen or a dozen different districts, or sets of workings, into each of which there is but a single entrance and a single exit. The result is that if creep should begin in one compartment it would not be able to pass so broad a "border;" and a similar advantage would occur in case of an explosion of fire-damp. These panels usually consist of twelve or fourteen bords, and crossings intersecting them; and the pillars are usually removed at about the same rate as that at which the bords progress. This, we shall see, is of importance, when we come to consider the ventilation required in collieries when they are exposed to outbreaks of gas from the coal liberated by the action of the pick, and of gas driven out by falls of roof, and brought in contact with the workmen and their lights.

These are the leading features which strike us in studying the principles of pillar workings, either as regards the great improvements which have taken place in the modes of working, or the dimensions of the pillars in proportion to the dimensions of the openings—the arrangement of the pillars in panels, and the possibility with this of taking away the pillars comparatively soon, and before they have sustained injury by pressure from above. The great advantage of this system is that there is no necessity for letting the roof move at all until the coal is got out. There is the advantage also of arranging the main working places very conveniently, so that every man may have his own stall, the great thing being then to let the men all do about the same amount of work, and each set of men have an equal interest in advancing the bords, and so keeping up the regularity of the whole work. Another point is that the amount of production which it is capable of being obtained from a certain area may be calculated very exactly, and so a greater or less number of men may be put on. It may be added that as the pillars are gradually removed, either by taking part of the pillars or by splitting them, the roof eventually is let down so gently as not to disturb the surface, or let its effects be visible; what is brought down filling up a larger space in that condition than before, when it was packed by Nature.

IMPROVEMENTS IN DRILLING MACHINES.—The invention of the Messrs. FRANCOIS and DUBOIS, of Liége, has reference to machinery where a piston receiving reciprocating motion by compressed air or steam inside a cylinder carries a chisel for driving holes by concussion. The improvements consist, firstly, in a peculiar arrangement for actuating the slide-valve of the cylinder. The slide-valve is connected at its opposite ends to two pistons working in cylindrical holes in the slide-valve box; the steam or air under pressure has access to both sides of the one piston, while the other piston (of smaller diameter than the first) is acted on the one side only by the steam or air under pressure, the other side being open to the atmosphere. An escape valve, actuated by a trigger and a tappet on the piston-rod of the machine, allows the steam or air to escape from the one side of the first slide-valve piston at the end of the back stroke of the machine, whereby the one motion if the slide-valve is effected for producing the forward stroke of the chisel. On the closing of the said valve an equilibrium of pressure is re-established on the said slide-valve piston, so as to produce the return stroke of the slide-valve. The driving chisel is rotated at each stroke by a pawl and ratchet-wheel actuated by a bar receiving a rocking motion from two small pistons in cylinders into which the steam or air under pressure is admitted alternately.

COMPRESSED AIR IN MINES.—According to a German correspondent of *Engineering*, an extensive use of compressed air begins to be made in continental mines, chiefly for boring-machines, coal-cutting machines, for raising stuff, and for lifting water. The mines of Westphalia, Friedrich, Wilhelm, and Tremonia, have since then introduced the Sachse boring-machine for sinking shafts and winzes. These machines are built and provided with air-compressing machinery by the Humboldt engine-works, formerly Sievers and Co., at Kale, near Cologne—a firm which, during 15 years, has also exclusively produced machinery for the purposes of mining, smelting, dressing ore, salt, phosphorite, &c. Coal-cutting machines, such as Firth's and others, are gradually finding their way to our collieries. At some pits of the Wuron district, near Aix-la-Chapelle, compressed air is occasionally used for raising water, and the contrivance is exceedingly simple. It consists of a closed iron cylinder about 5 ft. high and 2½ ft. diameter, which is provided with a valve at the bottom, and placed at the bottom of the shaft. Through the top goes a pipe from the surface to near the bottom valve, and there are besides one inlet and one outlet pipe for the compressed air connected with the cylinder. When this is filled with water through the bottom valve air is admitted, which presses the water in the first-mentioned pipe upwards through a common pump valve; then the air is allowed to escape by the outlet, when instantly the cylinder fills again with water, and the compressed air is turned on anew. This exceedingly simple machine is very useful, though not very economical, as compressed air is still rather expensive; however, one such machine requires only one man to handle. It does at the mines of the Wuron the work of 15 men employed on hand-pumps.

Meetings of Mining Companies.

SIERRA BUTTES GOLD MINING COMPANY.

An extraordinary general meeting of shareholders was held at the Cannon-street Hotel, on Tuesday, to consider the following resolutions:—That this meeting, being of opinion that the property referred to in the circular to the directors of the 4th inst. is convenient to be held with the Sierra Buttes Mine, authorises the directors to purchase the same on the terms stated in that circular, and to work it in conjunction with the Sierra Buttes Mine; and that for effecting the above-mentioned objects the capital of the company be increased by the addition of 281,250£., to be issued in 140,625 new shares of 2£. each, as proposed by the directors in their circular—

Mr. LEWIS R. PRICE in the chair.

Mr. JOHN SAUL (secretary) read the notice convening the meeting.

The CHAIRMAN said the resolutions he had to submit involved a question of very considerable importance, and embraced very large interests; therefore, he must ask the attention of the meeting while he attempted to dissipate some of the prejudices—or, perhaps, he ought rather to say the mistakes—which had originated partly, he was bound to confess, from an error in the circular of May 4, and partly from a misunderstanding of the real nature of the position to be held by the new shares which were to be issued. In the first place, he must mention that the directors never entertained the slightest intention of prejudging the case, or forcing upon the company this new property without fully satisfying the shareholders, and meeting with their cordial approval. In the various transformations which the first draft of the circular went through (and which was a necessary consequence of taking legal opinions and of consulting various interests) it became altered in a very important point—which was that the share list was to be closed on May 16, when the meeting was called for the 21st. This, as was pointed out to the directors, debarred those persons who had paid in their money from fair and free voting at the meeting, and those persons who had not paid in their money from participating in the new issue. He need scarcely say that that was never the intention of the directors, and it was far from their wish. The first draft of the circular never contained anything of the kind, and it was intended to be issued more than a month ago, when there was plenty of time to receive the answers of those favourable to the project, and upon receiving a sufficient number of assents to render it probable that the remainder of the shareholders would possibly approve of it, the directors would then have convened the meeting. But time rolled on, and various matters delayed the issue of the circular until it assumed the unfortunate form it did, when, by the conflict of the last paragraph of the circular of May 4 with the banker's receipt, seemed to exclude the shareholders from the free exercise of their judgment in the matter. But in the banker's receipt there was a sentence introduced between brackets, as follows:—"That the money is to be returned in the event of the proposed purchase, and the increase of capital referred to in the circular of the directors of the 4th inst., not being confirmed;" therefore, the shareholders would understand there was no idea or wish to prevent any person from giving free expression to his opinion—indeed, the directors of the company considered the property too valuable to be thrust down anybody's throat. There was another point he would call attention to contained in the report of Messrs. Janin and Ashburner. When the directors were about to print that report for circulation with the circular which was sent out, their attention was drawn to the fact that in the last line of the report, which was signed by Mr. Janin and Mr. Ashburner, as mining engineers, it was stated that the sum of $24,000 per month "must be regarded as a maximum estimate;" whilst in the summary it was stated that the same profit of $24,000 per month must be regarded as a minimum estimate. The directors, when their attention was called to that discrepancy, at once surmised what was the real fact of the case; but they did not venture to rest contented with mere surmise, but at once sent the following telegram to Messrs. Cross and Company, the agents in San Francisco:—"Last line Janin and Ashburner's report mentions $24,000 as the maximum monthly profit of Eureka; summary written two months later states same amount as minimum; which word is correct? Answer at once." In reply the following telegram was received:—"Janin absent; Ashburner confirms minimum, as stated in summary." Upon receipt of that the directors appended a note at the foot of the summary to the effect that the word minimum was confirmed by the telegram received from Messrs. Cross and Co. It had been assumed by some gentlemen that the summary was drawn up by the directors, but the fact was that the board had nothing whatever to do with the summary, which was drawn up in the hand-writing of Mr. Janin, and printed from that. The original report, although signed by both engineers, was written by Mr. Ashburner, and it came to this country in his writing; therefore, although he made use of the word maximum, it was clear from the telegram which had just been read that both Mr. Janin and Mr. Ashburner participated in the view that the development detailed in Mr. Lightner's letter of Jan. 29 had so far improved the prospects and condition of the mine as to warrant them in considering the $24,000 monthly as a minimum. One of the advantages of the acquisition of this new property (and the directors considered it a very important one) was the diffusion of the weight of the deferred shares, when they came to be dividend-bearing, over a much larger area, and consequently rendering it less probable that they would interfere in any way with the even course of dividends on the shares. (Cheers.) He could not venture to state when the deferred shares would become dividend-bearing—that time alone would show; but it was very evident the proportion between the shares of the company—between the 50,000£. deferred shares and the 175,000£. of active capital on which they are now paying dividend at the rate of 20 per cent. per annum, was in the ratio of 28½ to 100, and, consequently, when those 50,000£. shares become active and dividend bearing they would either have to diminish the dividend on the present active shares, or increase the production of the mine by 28½ per cent., or not far from one-third, which was a very considerable increase, and one which it might be very difficult to accomplish. But assuming the new property earned a similar rate, no matter what the rate was, the ratio would be the same; but assuming the new property earned an equal dividend with that derived from the Sierra Buttes property, it was quite evident that the proportions, varied as they would be, would represent 50,000£. deferred shares against a capital of 456,000£. active, and the ratio would be one hundred to eleven, and, therefore, they would only have to increase the produce of the mine by 11 per cent.—a point which he thought should not be lost sight of, for it was evident that 11 per cent. might much more readily be accomplished than an increase of 28½ per cent. One of the important points to be considered was the status or position which the new shares held with respect to the old shares, so that the original shareholders might possess the confidence that they would be protected (as they had a right) whether they possessed one share or a thousand. In consequence of the limited time allowed for purchasing the mine, the directors were not prepared, at the time, to issue the circular with any plan which would protect the interests of the original shareholders, and ensure that they should receive all the benefit without the possibility of receiving any injury from what was done. The shareholders would observe that the resolutions did not refer to it, and he might say it was only on Tuesday last that the directors agreed as to the terms to be submitted to shareholders. It was too late then to include those terms by way of a resolution emanating from the board, as fourteen days' notice must be given of any resolution; therefore, the resolutions, as printed in the circular, could not be altered; but the directors' idea was that they would introduce, by way of rider or amendment to the second resolution printed in the circular (namely, that raising the capital) the terms which they had agreed to recommend to the shareholders, and that rider was as follows:—"The new shares shall be distinguished as 'Sierra Buttes Shares, 1872,' and shall be entitled to a dividend only out of the earnings of the property to be now purchased, until that property has for four successive periods of three months each produced a net sum sufficient to pay dividends at the rate of 20 per cent. per annum, or upwards, on the new capital, and thereupon the distinction of the new shares as a separate class of shares shall cease." If that were carried out, the advantage derived by the original Sierra Buttes shareholders was that their property would not be injured by the acquisition of the new property, as their property would not be disturbed by it; but, on the contrary, they would receive certain benefits from the decreased general charges both here and in San Francisco, and also the advantage, not to be despised, of the large purchases which were made locally at the mines of timber, which was a very large and expensive item; and also of beef, for the company maintained its own labourers; and other articles used at the mines. A good many of these things were purchased by contract in the country surrounding the mine, and by buying larger quantities, of course, greater benefit would be gained. It must also be borne in mind that although the mines now proposed to be purchased were fifteen miles from the Sierra Buttes Mines, and the intervening country was hilly, still the same railway depôt (which was about 160 miles from San Francisco) would serve both the mines, and stores could be left at the depôt and sent to either mine. But it was never intended to send stores from one mine to the other. There were many other advantages which would accrue from holding the two properties together; for instance, in the way of obtaining better accommodation in the shape of new roads, for the shareholders would have greater weight and influence by holding a larger stake in the country, and more influence in the expenditure and the taxation, and other similar points, which, though they might not in themselves appear very large items to take into consideration, yet would give a considerable benefit in favour of working the two mines together. Now, he would take the worst supposition—that if the new mines would not prove adequate to what was anticipated or represented by Mr. Janin and Mr. Ashburner, what would be the position of the original shares in the Sierra Buttes? What would be simply this. He who took his full allotment of new shares of 2£. would run the risk—that is to say, he would maintain his old shares in their positive state, and run the risk on the new; but the shareholder who originally held in the Sierra Buttes, and did not take any new shares, would be decidedly benefited because he would lose nothing by the new mine, and he would gain the advantage after it had produced 20 or 25 per cent. for a time of having the surplus money divided over his shares when the distinction between the two classes of shares ceased. (Hear.) The directors had been asked from whom they obtained the option. They obtained it from Mr. Coulter, through whom the original Sierra Buttes Mine was obtained. He had an offer of this new property from San Francisco, on a basis at the price of $1,150,000, and that bond he transferred to the directors. It had also been said that money must have been made out of it at San Francisco. It manifestly the gentlemen who took the trouble to get the mine investigated and reported upon, and submitted to the company for purchase, were not likely to undertake the work and trouble for nothing. (Hear, hear.) But that was not the question for the shareholders; the question was whether the mines, as reported upon by Mr. Janin and Mr. Ashburner, were worth the price which was asked for them, whether it was a fair price, considering their state and the promises held out. That was really the only question they had to decide. The directors believed that the mines were worth the price, and had they not thought so they would not have submitted them to the shareholders. The very fact of its being submitted to the shareholders was a proof that the directors thought well of it, and also believed that they were benefiting the shareholders of the Sierra Buttes. The directors were large holders of original shares, and had not yet parted with any shares, and intended to take their full allotment of new shares. (Cheers.) The directors only show their faith in it, and submit it to the shareholders as a good thing. Of course everyone would have his own opinion. There was one more point which he wished to make a remark. It had been supposed that the directors had some interest in offering this mine to the shareholders. He could assure them that the directors had not the slightest interest; they simply thought that the property might be worked with advantage in combination with the Sierra Buttes Mine, and neither in the purchase of the original Sierra Buttes Mines, nor in the purchase of the mines belonging to the London and California Mining Company in the present purchase, had the directors any interest, share, or benefit, but it was equally participated in by every shareholder. (Cheers.) In conclusion the Chairman formally moved the first resolution—"That this meeting, being of opinion that the property referred to in the circular of the directors of the 4th inst. is convenient to be held with the Sierra Buttes Mine, authorises the directors to purchase the same on the terms stated in that circular, and to work it in conjunction with the Sierra Buttes Mine."——Mr. JANSON seconded the proposition.

Mr. LAMBERT could come to no other conclusion than that they proposed to give too much for the new mines. The report of Messrs. Ashburner and Janin was clear—the facts should be taken as they were, and not as they would be when the machinery had been improved; and he could see no object in mixing it up with the Sierra Buttes Company. If the property was as good as represented, why was not it purchased and worked by a separate company?

Mr. PORTER said his objection to the proposal was, to a considerable extent, removed by the rider proposed to be submitted. He considered the statement of the Chairman was most clear and satisfactory; but there was one weak point in the report of Messrs. Ashburner and Janin, and that was that it had not yet been decided how the mine could be worked continuously throughout the year, and no estimate was given of the expense of completing the scheme proposed. Another thing stated by the directors in connection with the Sierra Buttes Mine had been borne out by facts, the shareholders were bound to give the directors their confidence; but it was almost too much to expect that this new mine would turn out better than the Sierra Buttes, the capital of which, with the deferred shares, amounted to 225,000£.; the new mine should be much more valuable, because its capital would be much larger.

Mr. SURGEY said the report of Messrs. Ashburner and Janin stated most distinctly the amount of the profits for the year ending October, 1871. These reports say that between Nov. 1, 1871, and Oct. 31, 1871, the mills of the company crushed and amalgamated 8549 tons of quartz, which yielded 13,162·44 ozs. of gold, worth $217,831·33. This would show an average yield of $25·48 per ton, or 1·23 oz. of fine gold, the average fineness of the gold produced having been about 850 to 1000. No attempt was made to secure a uniform yield, and the consequence was that the extremes varied from $17 to $42 per ton, the average for the whole year being as above stated. The expenses of all kinds during this same period amounted to $86,909·63, or $10·16 per ton, and the profit for the year was, therefore, $130,921·70, or $15·32 per ton. That was equal to nearly 10 per cent. per annum upon the three mines, whereas the profit was yielded by one—the Eureka; the other two being comparatively virgin mines, Messrs. Ashburner and Janin declined to give an opinion. If the Eureka had actually earned a net profit of nearly 10 per cent. upon the total cost of the three mines, and Messrs. Ashburner and Janin told them that with the new stamps the net returns would be $24,000 per month, or equal to 20 per cent. upon the total capital, he could not help thinking the two mines would add materially to the value of their investment. The main point to ascertain was whether Messrs. Ashburner and Janin were incorruptible, and whether their opinions were entitled to respect. He had made it his business to enquire into these matters, and he had found that both were men of undoubted integrity and ability, and that they could not be "bought over" under any circumstances. They had proved their ability as far as concerned the purchase of the Sierra Buttes Mine, he could not help attaching the greatest value to their recommendation. A private letter was received from Mr. Janin, in which he described the property as a magnificent one, adding that Mr. Ashburner and himself had in their report adopted the cautious tone necessary when dealing with large figures, but without any hesitation he (Mr. Janin) said "Buy the property." All things considered, he (Mr. Surgey) could come to no other conclusion than that the purchase was a most desirable one, that it would add materially to the value of Sierra Buttes, and that in no case could its value be diminished—the shareholders had everything to gain and noohing to lose. He did hope, therefore, the majority of the shareholders would join in the recommendation, and complete the purchase.

A SHAREHOLDER said the question to be considered was the amount to be paid for the new mine. It appeared to him that Messrs. Ashburner and Janin did not strongly advocate its purchase, for in their general conclusions it is stated, having regard to two of the mines, too little of a reliable nature is known to enable them to express any opinion as to what profit may be realised by working them upon a large scale. Any estimate with regard to the average yield, which is the only question of real interest, would be most vague and uncertain. Under these circumstances they do not feel themselves warranted, from the insufficient data before them in attaching any definite value to this portion of the property, as it must have no real weight, and could only be regarded as the expression of a personal opinion, which might or might not be substantiated by future events. The Eureka appeared to be a valuable mine, but it seemed to him they were invited to purchase two bad mines and one good one; and as to the Eureka, Messrs. Ashburner and Janin's estimate of the aggregate and gross value of the ore did not agree with what appeared in the directors' report; in that respect there appeared a discrepancy.

Mr. KELLY agreed with Mr. Surgey as to the advantage the Sierra Buttes shareholders would realise by the adoption of the proposed purchase. He was intimately connected with parties in California who well know the Eureka Mine, and he had bought a large interest in Sierra Buttes, so as to acquire an interest in the Eureka. He considered all the advantages were decidedly on the side of Sierra Buttes.

Mr. PETHERICK had no hesitation in saying, as a miner, and knowing somewhat of California, and also of the parties reporting upon Eureka, that it was not of real money value to the Sierra Buttes, which was an exceptionally good mine, and they were not going every day to jump down upon a Sierra Buttes. He enquired the distance between the Eureka and the Sierra Buttes?

The CHAIRMAN said the distance was about fifteen miles.

Mr. PETHERICK said the Eureka was at present giving about 10 per cent., and supposing it succeeds, they must erect 16 additional heads of stamps, which would occupy some considerable time, before the maximum yield would be reached; therefore, some time must necessarily elapse before the shareholders in Sierra Buttes could derive any advantage. They were about to buy mines as an experiment, which money enough was being asked for them as if they were of realised value. In Sierra Buttes they got value for their money; but in the present case too much money was being asked, for they might or might not have the value returned. He had every confidence in the integrity of Messrs. Ashburner and Janin, but, however able they may be, they were liable to error of judgment as well as other people, and their *ipse dixit* should not be adopted without a careful examination. He was but a small shareholder, but possessed a little more knowledge that laymen as to mines; and when it was stated that all the advantage was in favour of Sierra Buttes, and that there could be no disadvantage, he begged wholly to differ from the Chairman, for unless the mines proposed to be amalgamated made a profit of 20 per cent. there must be a deficiency in the profits of Sierra Buttes. It was the first report of Messrs. Ashburner and Janin in which he (Mr. Petherick) had noticed a vagueness and incompleteness which he had never before seen in any of those gentlemen's reports, which made him (Mr. Petherick) rather doubtful; and unless the property was absolutely worth as much as the Sierra Buttes the shareholders were placed at a disadvantage. The report was not so clear and conclusive and pointed as Mr. Janin usually wrote, which made him (Mr. Petherick) rather doubtful; and he stated most positively, as a miner, that one year's results were not a fair protection for the Sierra Buttes shareholders, a colourable dividend might be made for one year, and, therefore, the shortest time given should be at least two years.

The CHAIRMAN, in reply to various questions, stated that the directors would have no objection to the period being extended to two years. With respect to working the mine continuously throughout the year, the directors had telegraphed for information on that point, and had received a telegram from San Francisco to say that arrangements could be made to work the mines throughout the year. With respect to the company purchasing one good and two bad mines, as one gentleman had remarked, the fact was they were paying for one good one and giving nothing for the others. Since the report was received a letter had been received from Mr. Lightner, which stated that in the Eureka Mine more quartz had been exposed, and there was also a widening of the vein. The quartz was of first-rate quality. It had been asked why this had not been brought out as a separate company. Some of the directors belonged to companies, and they did not like bringing out companies; it was alien to their usual course of life; but they thought it would be a decided benefit to the Sierra Buttes to acquire this property, and work it in the way proposed, for the Sierra Buttes shareholders would be placed in this position, that there was the possibility and probability of their deriving a great benefit, and the impossibility of any loss.

After some further discussion, the first resolution was put, and carried unanimously.

The CHAIRMAN then moved the second resolution, as follows:—"That for effecting the above-mentioned objects the capital of the company be increased by the addition of 281,250£., to be issued in 140,625 new shares of 2£. each, as proposed by the directors in their circular."——Mr. COULTER seconded the resolution.

Mr. SURGEY moved the "rider," as follows:—"The new shares shall be distinguished as 'Sierra Buttes shares, 1872,' and shall be entitled to dividend only out of the earnings of the property to be now purchased until that property has for eight successive periods of three months each produced a net sum sufficient to pay dividend at the rate of 20 per cent. per annum or upwards on the new capital, and thereupon the distinction of the new shares as a separate class of shares shall cease; the deferred shares, part of the original capital of the company, shall not be benefited by the produce of the property now to be purchased until they become entitled to to the payment of dividend out of the Sierra Buttes Mine under the terms of the original contract for sale of that mine."——Mr. PETHERICK having seconded

the adoption of the "rider," it was put with the resolution, and carried unanimously.

The CHAIRMAN said he had intentionally omitted stating before the resolutions were passed that there had been two telegrams received from Mr. Gashwiler, who was interested in the new mine, and who was anxious to secure a large number of shares; and another congratulating the company upon having the best gold mining property in the world under one organisation. (Hear, hear.)

Mr. COULTER mentioned that Mr. Gashwiler had offered to take 50,000*l.* worth of shares, but had been unable to get them.

A vote of thanks to the Chairman and directors terminated the proceedings.

VAN CONSOLS LEAD AND BARYTES MINING COMPANY.

A meeting of shareholders was held at the London Tavern, on Wednesday,
Mr. J. LITTLE in the chair.

Mr. MATTHEW GREENE (the secretary) read the notice convening the meeting.

The report of the directors and balance-sheet (which have already appeared in the Journal) were taken as read.

The following report from the manager was read:—

May 21.—LEAD DEPARTMENT: I beg to submit to you my report on this mine for your perusal and guidance in carrying out future operations, and shall be prepared to answer all questions you may see fit to put to me at your meeting to-morrow. When I took the management of your property on Jan. 1 last I deemed it expedient to carry out the operations as much as possible on the north part of the lode, where former experience taught me to expect discoveries of ore if any existed in the lode, and I am happy to inform you that we have already been successful in our operations, which I shall proceed to describe in detail. The 55, east of Gundry's, had been driven some 11½ fms. on south part of lode, which was unproductive. I then got the level cleared out and perfectly secured with timber, and resumed the drivage east on north part of lode. Up to this time we have driven some 14 fms. thereon. In this distance we found a great many pieces of solid ore, and a mixture of ore in places therewith. The lode in the forebreast now consists of blocks of carbonate of lime, a little flookan, and a small quantity of gritstone, impregnated with lead and sulphur, therefore, from its congenial nature I fully expect to discover lead ore and carbonate of barytes in large quantities, as the drivage approaches the productive ground in the deep adit and west of Little's. I may here add this level is from 60 to 70 fms. deep from the surface on the lode, therefore I recommend its being driven forward with all dispatch, with a tramroad laid therein for discharging the stuff. It can be rapidly driven to Little's, and extended therefrom to Glyn shaft, which will develope the property that far in a very satisfactory manner, and I fully believe the result will be all that the shareholders can fairly desire. The 55, west of Gundry's, had been driven about 32 fms. from shaft, on south part of lode. At this point I directed a cross-cut to be driven north through the lode, but without discovering anything beyond a little blende. I then resumed the drivage west on the north part of the lode, where we found small pieces of detached lead ore. We still have the junction with the north lode some 15 fms. before us. The level is suspended at present, but I shall return to it as soon as I can get the communication effected between the 25 at Little's and deep adit. The deep adit east of Gundry's has been cleared, enlarged, and secured to end, and a great number of fathoms of north part of lode cut down, which consists of lead ore, carbonate of barytes, and blende for some 20 fms. in length, average value 25*l.* per fathom. Our operations here are now confined to rising to communicate with Little's; this accomplished we shall be able to stope the back (25 fms. high) to great advantage, bring all the water at Gundry's for pumping, and thereby dispense with rope and lifts, &c., fixed in that shaft.—Little's Shaft: The 25 east is extended about 23 fms. on the north part of lode. We have found no ore of value yet, but from the highly congenial matrix it is composed of I am daily expecting the pleasure of informing you that a good course of lead ore has made its appearance. We have before this end virgin ground, some 300 fms. and upwards in length, and which I anticipate large returns of ore from. About the eastern boundary I remember a little work being done some years ago, and some 6 or 7 tons of lead taken from the back of the lode, but at that period they had no means for drainage, consequently the work there was abandoned. The 25 west is extended some 15½ fms., and I have the satisfaction of saying through a good lode of ore nearly all that distance. I may also here remark that the back was never equal in produce to the bottom of the level. The specimens of lead sent to the office are from the bottom, and not more than 2 fms. west of the shaft. We are sinking a winze under this level to meet the rise from deep adit, which is about 6 fms. west of the point last referred to. Here the lode is worth fully 3½ tons of lead ore per fathom, and indicates a still greater value at a deeper point. When the communications are effected we shall be in a position to make good returns. The rise in the roof of the 25 is upwards of 5 fms. high, in a good lode of ore, averaging from 2 to 3 tons per fathom. We are now rising on south part of lode to facilitate the communication with the 15 fm. level for ventilation. This I expect will be holed on or about Thursday next, which will enable us to sink the winze with greater dispatch, and resume the 25 west, where the sode is very promising. The 15, west of Little's, is driven over the rise from level below, and we are now sinking to meet it. A porous lode has been met with in the end, which apparently will soon be in good produce. I shall resume this when the communication is complete. Judging from the ore already discovered and the highly promising ground before us, I see no reason to doubt a very valuable mine being opened out. All the pumping machinery required is fixed, indeed when Little's and deep adit are connected we shall have a great deal out of use; therefore the cost in future will be chiefly confined to the development of the lode. We have about 50 tons of lead ore on the mine, many tons of carbonate of barytes, and a little blende, which we shall in a short time greatly augment. P.S.—In the foregoing report I have not alluded to the reserves of ore and carbonate of barytes. The ground already laid open will produce several thousand pounds worth of ore, &c., for market, therefore as soon as the communication is effected we shall be able to make good returns, independent of the discoveries that we shall doubtless open out in the meantime.

BARYTES DEPARTMENT.—We have still a large lode of barytes before us, from which two men raise a sufficient quantity to keep our mills and calcining furnaces at work, and the lander and filler at Gundry's tram down enough for that purpose when they are not fully employed discharging stuff from underground. The incline has been put through repair, rollers fixed, &c., which greatly facilitates transit of barytes from the deposit to the works. The mill wheel millstones and gearing attached thereto have also been put into effectual order, therefore we experience no difficulty in grinding quantities to keep the bleaching tanks in full operation. The bleached barytes made stands well in the market, and therefore we have as many orders for it as we can execute. Stock, &c., I need not refer to here, as you have been duly advised on that point. The projected tramway, when made, will be a great boon to this department, as well as the lead department, inasmuch as I fairly calculate a saving of 60 per cent. will be effected in carriage of material and produce to and from the mine, which will amount to 600*l.* per annum and upwards.—JAMES ROACH.

The CHAIRMAN moved that they be received and adopted?——Mr. JAMES RICHARDSON seconded the proposition.

Mr. W. WARD: What do you compute will be the value of the available reserves when the communication shall have been effected?——Capt. ROACH: Several thousand pounds worth.

Mr. WARD: Can you give any money value?——Capt. ROACH: From 4000*l.* to 5000*l.* worth in lead and carbonate of barytes. We have not stoped a single inch since ore was first discovered; therefore, all the ground passed through is standing.

Mr. WARD: That's above the winze?——Capt. ROACH: Yes; 25 fathoms under Little's. I consider the greatest deposit is under that point—in fact, there is no doubt about it. The rise has gone up 5 fms. only on the north part under Little's through a lode averaging 3 tons per fathom, and both ends good. At present we are rising through the "soft," or flookan, for the purpose of facilitating ventilation, which we expect to accomplish to-morrow, and in a short time we shall communicate from Little's shaft to the deep adit, when the mine will be perfectly ventilated from end to end.

Mr. WARD: What do you estimate will be the value of the reserves then?——Capt. ROACH: Already there are several thousand pounds worth of ore discovered, and the future will mainly depend upon how the winze goes down and the rise goes up. The lead will fetch about 14*l.* per ton, the ore being as good as any in the district, and precisely the same character as at Van.

The CHAIRMAN: You can communicate between the deep adit and Little's in four months?——Capt. ROACH: Or less.

Mr. HAMILTON: We have heard a good deal about the winze having fallen off, and that the lode had been completely cut out. Is that true?——Capt. ROACH: It has never fallen off in any way. There is a course of lead from top to bottom, and I expect ore in the rise for many fathoms. There is a good lode in the rise in the north part, but it has been left for the purpose of facilitating the communication.

Mr. HAMILTON: What is the supposed length of the bunch of ore that has been gone through?——Capt. Roach: We can see it at Little's for about 12 fms. in length, and longer than that in the adit.

Mr. HAMILTON: Do you expect from your experience that this bunch will extend in depth?—Capt. ROACH: This appears to be lengthening, but it has not yet been sufficiently opened in the deep adit. We have got the lode at a distance of 140 fms. apart.

Mr. HAMILTON: Something is said in your report, Capt. Roach, about your experience. May I ask what has been your experience?——Capt. ROACH: I have had many years' experience, and was the manager of this mine 15 years ago, and I know this lode throughout for seven miles in length. I have never seen much in the "soft," and, therefore, I have begun opening upon the hard part of the lode.

Mr. ROSEWARNE: How many men have you in the winze?——Capt. ROACH: Nine.

Mr. ROSEWARNE: How many constantly?——Capt. ROACH: We only had four last month, because we had preparations to make.

Mr. ROSEWARNE: How much are you paying for the winze?——Capt. ROACH: About 12*l.*

Mr. ROSEWARNE: How deep is the winze?——Capt. ROACH: About 2½ fathoms.

Mr. ROSEWARNE: I saw you said that on April 11 you commenced the winze under the 25 in a good bunch of ore, and up to May 8 you only had 6 feet.——Capt. ROACH: We found we had commenced too near the rise, and therefore had to commence a second winze.

Mr. ROSEWARNE: How many tons are there now at surface?——Capt. ROACH: About 50 tons.

Mr. ROSEWARNE: You value the lode, I presume, for the length of the rise?——Capt. ROACH: I mean for exactly 6 feet; I confine myself to the length the rise was commenced.

Mr. ROSEWARNE: For what length are you carrying the winze?——Capt. ROACH: A little under 8 feet.

Mr. ROSEWARNE: When you value the lode in the winze at 3 tons, I suppose it is for the length of the winze?——Capt. ROACH: I value it at 3½ tons for the 8 feet.

Mr. WOODCOCK: What is the distance between Gundry's and Little's shafts?——Capt. ROACH: About 140 fms., and the lode has recently been found in the deepest part of the mine, going towards Little's. By driving from Little's to Gundry's, a distance of 140 fms., at a depth of 30 fms. below the present point (which can be done at the rate of 5 to 6 fms. per month), the whole of the eastern ground will be tested, and I confidently believe we shall open up several valuable bunches of ore. (Hear, hear.)

The motion adopting the report and accounts was put and carried unanimously.

Upon the proposition of Mr. HAMILTON, seconded by Mr. BURNETT, the directors were re-elected, with the addition of Mr. Freeman.

The CHAIRMAN said that Mr. Freeman would be a very valuable director, knowing, as he did, more about barytes than all the directors put together. He (the Chairman) did pretend to have some knowledge of mining, and would do his best to promote the best interests of the company; but Mr. Freeman was the man upon whom they depended for information in connection with barytes.

Upon the proposition of Mr. HAMILTON, seconded by Mr. WOODCOCK, the auditors (Messrs. Johnson, Cooper, Evans, and Wintle) were re-elected.

An extraordinary general meeting was then held, for the purpose of taking into consideration, and, if deemed advisable, passing special resolutions for the creation of an additional number of shares, in order to raise more capital for the carrying out of the works recommended in the directors' report, and also for the general purposes of the company's property,—Mr. J. LITTLE in the chair.

The notice convening the meeting was read.

The CHAIRMAN explained that the object in raising additional capital was for the purpose of constructing a tramway and the erection of dressing-floors, by which the general expenditure, and especially the item for carriage, would be very considerably reduced. The tramway could be made for about 3000*l.*, and would quickly return the whole of the capital, in addition to a very heavy interest upon the outlay; and sufficient had been seen of the mine to fully justify them taking the course now recommended. The tramway would be laid down through a valley to the barytes works, and to a most eligible spot for their ore-floors, where there was an ample supply of water. The ore wagons would run from the shafts by means of an endless rope, the gradients being such that the full wagons running down would carry the empties up. They had obtained the right to lay the tramway from almost all the necessary parties, and no difficulty whatever was anticipated. He then proposed—"That the capital of the company be increased by the creation of 5000 additional shares of 2*l.* 10s. each.

Mr. RICHARDSON seconded the proposition.

A SHAREHOLDER asked the object of creating more shares than was absolutely required?

Mr. GREENE said that some two years since ground known as the "Glyn sett," was added to the property of the company. It was admitted on all hands to be an important and valuable addition, upon which they proposed to expend a little of the capital.

The CHAIRMAN said that only 3000 of the new shares would be issued; the remainder could only be issued with the power of a general meeting.

Mr. GREENE considered it only a prudent course to create 5000 new shares for a mine like Van Consols. They did not expect 7500*l.* would be required, and if not the remaining 2000 shares would most certainly not be issued.

The CHAIRMAN said it would be a very great benefit to the company to have sufficient capital to carry out the contemplated works thoroughly and completely. There was plenty of ore discovered in the eastern part of the mine to pay for all the works now proposed. He held a very large interest, and should not advocate expending money without feeling pretty sure successful results would be realised.

Mr. HAMILTON had always considered that the ground between Little's and the eastern boundary towards Penn-y-Clynn and Van greater riches would be discovered than any yet opened upon.

Mr. ROSEWARNE had always entertained a favourable opinion of the eastern part of the mine.

The CHAIRMAN fully believed that east of Little's they had a splendid mine. The former workers sunk a shaft about mid-way, and at a depth of about 12 fathoms opened upon a very nice lode of lead; but Van had not then been discovered; and the then company not being well supplied with capital, the sinking was discontinued, and he fully believed would prove a very fortunate thing for the shareholders in this company. (Hear, hear.) He believed they would have a very valuable mine there at about 12 fms. from surface.

Mr. HAMILTON asked if the expense connected with the talked-of lawsuit was to be borne by the company or by the respective individuals?——The CHAIRMAN said the company were in no way connected with any lawsuit, nor so long as he was upon the board would he sanction the company entering into a lawsuit without the special permission of the shareholders. (Hear, hear.) It was altogether a different question if individual shareholders, holding a large interest in the company, thought fit to commence proceedings against those who, having sold shares they did not possess, resorted to unfair and dishonourable expedients to intimidate *bonâ fide* holders, so as to enable them to make good their bargains. (Hear, hear.) All such expenses, however, must come out of the pockets of the individual shareholders unless the board had the special sanction of the shareholders to the contrary. (Hear, hear.)

Upon the proposition of the CHAIRMAN, seconded by Mr. GUERRA, it was unanimously resolved:—"That 3000 of these shares be rateably divided amongst the persons holding shares in the Van Consols Lead and Barytes Mining Company (Limited), on May 22, 1872, in the proportion of one additional share for every five shares held in the company on that date."

It was also resolved—"That the said 3000 shares so divided be paid for as follows:—1*l.* per share on application, 15s. per share on allotment, and 15s. per share at a date not less than four months from the date of allotment. That all shareholders not taking up their quota of new shares within the time to be prescribed for so doing do lose all right and title to the same, and that such shares be left in the hands of the directors for disposal for the benefit of the company, and that the remaining 2000 shares be held in reserve, and only issued by special resolution at a general meeting of the shareholders."

Mr. GREENE thought it might be as well to mention that the present meeting was very largely represented, there being by proxy alone something like 10,000 shares. (Hear, hear.)

Mr. HAMILTON said they could not separate without according their best thanks to Mr. Greene, their secretary, to whom they were indebted. There could be no question that had it not been for Mr. Greene's perseverance and tact Van Consols, as a company, would have been among the things of the past. (Hear, hear.)

The CHAIRMAN seconded the proposition, which was put and carried unanimously.

Mr. GREENE, having acknowledged the vote in appropriate terms, stated that he was the pioneer of the Van Consols before Van was discovered. The Van Consols Company possessed a mile of the Van lode, and unwrought for a very long distance. Two years since he succeeded in securing the Glyn property for 225*l.*, and presented it to the Van Consols Company. He had always been the largest shareholder, and would never consent to be associated with this or any other mine in the success of which he did not have the fullest confidence. He believed they were on the top of a great gulf of ore; and that when the mine was further developed, and the tramway and dressing-floors completed, the shares would advance to a very high price.

Capt. ROACH, in acknowledging a vote of thanks for the successful manner in which he was opening out the mine, said he had always entertained a very high opinion of the mine, and recent developments had more than confirmed his opinion. He firmly believed that if the mine be properly developed—and so long as he occupied his present position he would always do his best to do so—that most successful results would follow, and that the shareholders would be amply rewarded for their patience and outlay. (Hear, hear.)

A vote of thanks to the Chairman and directors concluded the proceedings.

BEDFORD CONSOLS MINING COMPANY.

A general meeting of shareholders was held at the offices of the company, 81, Old Broad-street, London, on Wednesday,
Mr. T. S. G. KIRKPATRICK in the chair.

The notice convening the meeting was read, and the minutes of the last confirmed. The accounts showed a credit balance of 383*l.* 19s. 11d. The agent's report was read.

The CHAIRMAN said—When we met last January and determined to prosecute the developing of this mine with vigour we calculated that 1s. call would carry us on for four months. I am happy to say that owing to the able and economical management of Capt. Rowe, our manager, and Capt. Mitchell, our agent, the work done has exceeded our most sanguine expectations, while the cost has fallen so much below our estimate as to leave us a sufficient surplus to carry on for upwards of two months. A call of 6d. per share, payable July 10th, which we propose to-day, will, we hope, place us in a good position before our next meeting. In a letter from Capt. Rowe, dated 18th inst., he says: "The shaftmen are working splendidly. I am quite pleased with their exertions. I hope soon to be able to report a good bunch of ore." And in speaking of Gawton he says: "There is nothing very new here except a splendid lode in the 105 level east towards Bedford Consols, 5 ft. wide, all mundic, and ore, and prian, the prettiest looking lode ever seen in the mine." On the 21st he reports: "Since the commencement the engine-shaft has been substantially timbered around, and near the surface, cut down, and enlarged 45 fms. deep, with dividing timbers put in, and footways fixed from surface to the present bottom, all in good condition to receive the required pitwork. The shaft is now sinking by a full staff of men below the level, on the Gawton main lode, which is at this point producing fine stones of rich quality copper ore, accompanied with tin. We propose to sink this shaft 10 fms. below present bottom, and then drive levels east and west on the course of the lode below the rich quality ore which shows in the level above; and as we have every reason to believe this ore holds in depth, we calculate on having a property of great value." You will remember Capt. Mitchell speaking of this lode in his report in January, said: "This lode has been found productive of copper to the value of 3 or 4 tons per fathom in places over 70 fms. in length, and evidently shows to have passed over a rich shoot of ore in the drivage of the adit." So that though we are sinking at the bottom of the level in what was reported as the poorest part of the lode, we may congratulate ourselves on its having proved so good. Capt. Rowe continues: "A few fathoms from our engine-shaft, as shown on the plan, can be plainly seen the same cross-course come to us from the Devon Great Consolidated Mines, which undoubtedly made their great deposits of minerals, as also of the intermediate lodes, such as Old Wheal Russell, which is also a dividend mine on the track of the same cross-course, intersecting the lodes. The knowledge of these intersections is considered by high practical mining authorities in this locality to be one of the leading features in the future prosperity of Bedford Consols, crossing, as it does, all the champion lodes of the sett, which are six in number, including the great tin lode to the north of the present working, which is opened on, and found 9 ft. wide at a few fathoms from surface, producing rich stones of tin." The surface work is also in a very forward position. We have made a very satisfactory arrangement with the Gawton Company for the use of their water-wheel. The water-power is our own, and we have sufficient pumping power at a nominal cost to work the mine for years to come. This arrangement was the result of careful consideration on the part of Capt. Rowe, and I think we may congratulate ourselves in having so careful and thoroughly competent a manager. He has also arranged to dress the ore and render it marketable close to the wharf on the Tamar river, which will save all expense of transit.

A call of 6d. per share was then made.

EAST WHEAL BASSET.—At a meeting of adventurers, held at the mine on May 14, the accounts showed a debit balance of 1063*l.* 5s. 1d., a call of 3*l.* per share was made. Capt. John Lean says—"The stamping-engine is on the mine; two stamps axles for 24 heads are also on the mine. In the course of a week another axle for 16 heads, with lifters and heads complete, will be on the mine. The masons are progressing with the buildings as fast as circumstances will permit. I think it will take near six weeks from this time to complete the engine-house and loading. We have risen since the last meeting about 600*l.* worth of tin, which compares favourably with former raisings. The present prospects are such that the returns will be considerably increased, and the stamps will not be working too soon, if it were possible to be in the ensuing week."

OLD GUNNISLAKE.—At the meeting, on Wednesday, it was decided that the company should be wound-up voluntarily, and that Mr. F. T. Wells, civil engineer, North-street, Westminster, should be the liquidator.

ST. IVES CONSOLS.—At the meeting, on Tuesday, the accounts showed the total cost for the quarter ending March to be 3636*l.* 15s. 6d.; the credit for same period, 4254*l.* 5s. 4d.—Balance against adventurers end December, 1871, 559*l.* 10s. 11d.; the credit in favour of adventurers in March, 1872, 63*l.* 15s. 11d.

WHEAL OWLES.—At a meeting of adventurers, held at the mine on May 17, the accounts for Jan., Feb., and March showed a profit of 992*l.* 6s. A dividend of 1000*l.* (12*l.* 10s. per share) was declared, and 203*l.* 2s. 7d. carried to credit of next account.—Work performed during the quarter:—108 fms. 4 ft. 11 in. driven in levels, and 81 fms. 0 ft. 11 in. sunk in shafts and winzes: 40 pares stoping for tin on tutwork; and 24 pitches working on tribute.

[For remainder of Meetings see to-day's Journal.]

FOREIGN MINING AND METALLURGY.

With the approaching closing of the canals coal freights have been advancing in Belgium. Deliveries are being pressed on, the extraction has somewhat slackened, and the upward tendency in prices has become more decided. Quotations for coke have not varied in Belgium. As the future presents itself under a tolerably smiling aspect, no apprehensions are entertained of any important reaction in prices for some time to come. Present engagements represent almost the whole of the current production and stocks combined. English competition is diminishing every day, in consequence of the excessive elevation in prices in England; and France is as busy as possible, so that no lack of orders is anticipated from that quarter. The domestic coal consumption of France has been met hitherto to some extent with English coal, but French consumers are now expected to obtain domestic qualities of coal in Belgium. It appears that M. Braconier, of Macar, President of the Liége Coal Mines and Metallurgical Association, accompanied by M. Maréchal, honorary engineer of that body, has visited Sweden, in order to ascertain the richness of the coal bearings of the Scania field, of which a very favourable report had been made. The bearings are found to be considerable, and M. Braconier has acquired several concessions, in order to commence the extraction of coal as soon as possible. The scarcity of coke appears every day more decidedly in Belgium; washed cannot be obtained for less than 1*l.* 4s. per ton, while unwashed realises 1*l.* 0s. 10d. per ton.

The re-establishment of a scale of 16s. per ton between each class of iron in France may now be regarded as an accomplished fact. All the industrials of the Nord have notified the adoption of this resolution, and in the Haute-Marne a similar decision will be arrived at by June 1 at the latest. Advices received from all the other French iron-producing centres indicate a desire to imitate this policy. The rise in the price of iron in France appears to be marching on with rapid steps. In the Nord, No. 3 is quoted at 12*l.* per ton; and No. 4, at 13*l.* 4s. per ton. In Champagne coke-made iron has exceeded a quotation of 10*l.* 16s. per ton. There appears to be an increasingly prevalent impression that the present dearness of iron will continue some time in France. Charcoal-made pig has attained a quotation of 6*l.* 4s. per ton in Champagne; second fusion is quoted at 6*l.* 12s. per ton; but, nevertheless, these prices have not yet become general. Chain iron has advanced 16s. per ton. From the Loire district we learn that the Terrenoire Company is completing the installation of a third blast-furnace, intended to supply its Bessemer converters with material. In 1871 Bessemer or Martin steel is stated to have been made under the form of rails, bars, tyres, &c., to the extent of 253,662 tons in France.

The French metal markets have been generally feeble, but this weakness has not extended to copper, which has about maintained previous rates. English copper has, indeed, somewhat advanced in the French capital during the last few days. Chilian, in bars, delivered at Havre has been quoted at Paris at 104*l.*; ditto, in ingots, 106*l.*; tough English, 106*l.* 18s.; and Corocoro mineral, pure standard, 106*l.* per ton. Upon the Havre market no fresh important transactions have been reported. At Marseilles, on the contrary, a rather considerable amount of business has been passing in copper. The condition of the German copper markets has been satisfactory to holders, and prices have been firm. At Rotterdam, Russian crown is quoted at 51 fls.; and Drontheim at 50 fls. to 52 fls. The French tin markets have been weak. At Paris, Banca, Straits, and English tins have all fallen about 1*l.* per ton. At Marseilles, however, quotations for tin have been pretty well supported. Upon the German markets prices have experienced no material variation, but transactions have not been very numerous. At Rotterdam some transactions have taken place in Banca at 95 fls., and in Billiton at 94 fls. The French lead markets have not presented any very notable variation. English lead has, however, fallen 2s. per ton at Paris; Belgian and German leads are held at Paris at 20*l.* 16s. per ton. At Marseilles lead, in saumons, first fusion, has brought 19*l.* 4s.; and second fusion, ditto, 18*l.* 16s. per ton. The German lead markets have exhibited favourable tendencies; a recent rise is everywhere accepted, and there are signs of a fresh advance. In Holland lead quotations have not materially varied. Zinc has been generally quiet; at Paris, Silesian has fallen 2s. per ton.

The condition of the Belgian iron trade has not experienced any material change. There is always the same upward tendency, the same scarcity of raw materials, the same difficulty of obtaining pig. Refining pig, first quality hard iron, is held at 4*l.* 12s., and casting at 6*l.* per ton, and astonishment is expressed that these quotations remain stationary. The aspect of the market seems to indicate that a further advance will take place before long. As regards merchants' iron, all the works have adopted a standard of 4*l.* 12s. per ton, and everyone accepts it. It is the same with plates; quotations of 13*l.* 12s. for No. 4 and 12*l.* 16s. for No. 2 have become general. The mechanical construction establishments are working with energy, but those which had not taken the precaution to lay in supplies of special irons have been reduced to rather serious embarrassments, and there is some danger of their losing in the shape of penalties for delays attending the execution of contracts the profits which present prices seem to assure them. English wheels and tyres are no longer coming to hand in Belgium, and everywhere the owners of mechanical works find it increasingly difficult to fulfil their engagements. Fortunately the railway companies, finding that the demand of the public for more rolling-stock has somewhat abated, accept with some willingness the delays which unavoidably attend the execution of contracts. It is remarked, however, that German companies exact delay penalties with severity.

The price of coal remains firm in France in sympathy with the course of the markets of other countries. In the Pas-de-Calais coal mining industry is exceptionally prosperous, the demand assuring the sale of the whole of the estimated production for some time to come. This state of affairs has not been profitable to industrials alone, but wages have also risen, good working miners now earning 3s. 9d. to 5s. per day. A strike at Rouchamps, which has occupied some attention appears to have happily nearly terminated, local influences having brought about an understanding between employers and employed; almost all the workpeople have resumed work, and order has not been for a single instant disturbed. It is complained that the great railway companies are endeavouring to snuff out little local lines, which might on being combined together do them some little injury by competition; it is stated that a movement is even being made for the abrogation of a law of 1865 on railways of local interest. A company has been formed under the style and title of the *Comptoir des Houilles* to encourage the working, conveyance, and commerce of coal; the capital proposed for this undertaking in the first instance is 60,000*l.*, but it may be carried to 400,000*l.*, by a decision of a general meeting. The new company will lend its assistance as an intermediary to mining companies in connection with the constitution or augmentation of their capital, it will participate in all operations for the sale or lease of plant, it will negociate loans for industrial purposes, it will acquire an interest in the journal *La Houille*, and it will establish a technical committee charged with the duty of studying or executing on account of third parties industrial projects. It will create finally a special market for mining securities, and it will collect coupons, &c. The promoters will take as their model the Belgian *Société Générale* the success of which has exceeded all expectations.

FOREIGN MINES.

SNOWDRIFT (Silver Mining and Reduction).—The directors have received the following from their engineer, Mr. Ernest le Neve Foster, dated May 1: "I enclose the certificate of assay of a specimen of Snowdrift ore, of which we had about 50 lbs.: 5883 ozs. in silver per ton of 2000 lbs.; coin value, £7,606·13."

I.X.L. (Gold and Silver).—The following report has been received from the mines:—On April 20 the first 50 ft. of additional tunnel was completed by the contractors, and two-thirds of the contract price (£11 per foot) paid them. There has been great delay in this work, in some measure owing, no doubt, to the very stormy state of the weather, but a good deal more, I believe, to the inaction of the contractors and the men employed by them. A week, for instance, was passed in going over their work again, re-timbering placed I was dissatisfied with, and altering the drainage; the delay, of course, is their loss. Last night they had run about 10 ft. additional, and we have now in the "face" some 18 in. or so of extremely good looking quartz, showing a considerable amount of ruby ore throughout. Though this seam narrows somewhat towards the centre, it widens out both above and below, indicating that in either of these directions we may look for a still larger body of ore.

COLORADO TERRIBLE LODE.—Extract from the agent's letter of April 29: "Saturday being our measuring day, I made a close examination of all the workings. All appears about the same as when I last wrote. The shaft is down 31½ ft., pitching about the same—30° north. We are sinking upon several fine veins of ore, from ½ to 3½ in. wide; to all appearance they will join into one vein. I have made several assays from the ore taken out of the shaft at a depth of 25 ft. as follows:—1900, 432, and 375 ozs. per ton. The ore was taken from different parts of the shaft. Mr. Clark will be up next Friday, with the intention of staying a few days. We shall make a thorough examination, and report the same to you. The jigging-machines are working well; I expect to have them all working by the middle of next month.

BATTLE MOUNTAIN.—Capt. Richards, April 25: **Virgin:** Bishop's winze, sinking in the bottom of the 113 ft. level, has been resumed. The cross-cut eastward towards Lake Superior will be holed to the 135, at Lake Superior, by next week's report. The stopes in the back of the 113, south of Roach's winze, are still producing rich ore, and, although fallen off in quantity, it looks promising, and may in a short distance be as productive as ever. In the 113, driving north, the lode is poor, but of a promising character. In the midway drift, between the 73 north and the 37, the lode produces some fine ore. We shall communicate this drift with Jury's rise in the course of two or three days. This will be convenient for stoping the back, which promises to yield a fair quantity of pay ore.—**Lake Superior:** The 135 ft. level south has been suspended, and the men put to rise in the back between Pryce's shaft and the present end of the drift, to prove the lode; this will be known as Daniel's rise,

— April 29: Judging from the quantity and value of the ores already sent you, on so small a scale of working, the only conclusion deducible is that we may open up mines which this generation would not see the end of.

— Capt. Richards writes, under date May 3:—**Virgin:** In Bishop's winze, sinking below the 113 ft. level, at £3 per foot (company providing board) there is no material alteration, but I hope for a change soon. The cross-cut in the 113 ft. level, towards Lake Superior, has been communicated therewith at a depth on the angle of the lode of 135 ft. there. It was intended that the bottom of the 113 cross-cut should come in equal to the bottom of the 135, and it is so, proving the dialling measurements and levellings of the ground to have been accurately done. This communication is important, inasmuch as it thoroughly ventilates both the mines at the depth mentioned, and it will enable us to sink a winze in the bottom of the 135, at Lake Superior, which we could not otherwise do for want of air. The stopes in the back of the 113, south of Roach's winze, are producing some rich ore—a fine looking lode. In the 113 and 73 north we have done but little during the past week, the men being engaged elsewhere. In the midway drift, between the 73 and 37, a hole has been put through to Jury's rise, and some good ore is being taken therefrom. In the back of the 73, south of Roach's winze, over original drift, we are spilling through the old stull; when we get through it will enable us to take away the ground near the hanging wall to much greater advantage.—**Lake Superior:** In the 135 and the 113 cross-cut, leading to the engine-shaft, a tramroad is being laid, for the more economical getting away of the stuff. Daniel's rise, in the back of the 135, south of Pryce's shaft, is going up at £3 per foot (company finding board), in a lode of a very promising character, and producing some leaf copper, &c. As soon as the road is completed we will commence a winze, to further prove the depth of the lode. There were 840 sacks raised during the week.

ANGLO-ARGENTINE.—Capt. Joseph Vivian's report for February states that during the month stamps (12 heads only) have worked 18 days. They did not continue stamping the whole month, because the ore crushed during January was all on hand, and it was not of the slightest benefit to stamp more ore than they were in a position to amalgamate. Amalgamating with two arrastras commenced on Feb. 6, and produce cleaned up to date amounts to 103 ozs. 12 dwts. 18 grs., which may be considered satisfactory when the incomplete state of the amalgamating appliances is taken into consideration.

CAPE (Copper).—The directors have despatches per Northam: The mining reports are without material changes. Returns yield from Ookiep 575 tons of 33 per cent.; from Spectakel, 85 tons of 36 per cent. Railway accounts not received. Bills of lading are received for 800 tons of ore per Mary Tatham, and 55 tons of regulus, per Northam; 391 tons of ore, ex William Graham, have been sold by public ticket at an average of 20s. 6d. per unit, realising approximately 12,800/.

RHINE.—May 14: **Schmelzer:** The 27 fm. level, on the Toni lode, was driven during April 4 fms. 4 ft. 1 in.; the lode over that distance bore a little blende, but fell off in value as compared with the previous month, and is at present unproductive. The end is being driven by four men. The winze in the 17 fm. level to prove the Schmelzer north lode, was sunk in April 1 fm. 0 ft. 10 in. The small leader of lead ore is still in the winze. The winze being in the footwall ground, and the branch referred to having let down a good deal of water, sinking became very slow and expensive; it was thought desirable, therefore, before sinking further to cross-cut to the lode, which had taken a flatter underlie. Up to the present 2 fms. have been driven, and a leader of lead seen in the 17 between the Schmelzer side and north lode has not been intersected, but the north lode has not been met with, and it seems doubtful whether the lode holds down. This intermediate level is 5 fms. below the 17. The end is near the side lode, which we hope to intersect in a few days, and then by continuing the level 2 or 3 fathoms to cut through the junction of the side with the Toni lode. In the south-east end, on the Schmelzer north lode, 17 fm. level, a rise is being put up to stope away the branch of blende; the branch is about 3 or 4 inches wide, and the ore is of good quality. At another point in the same level one man is employed stoping blende; the ore-producing part of the lode varies from 9 in. to 18 in. wide, yielding often ribs of solid blende of very good quality. Stoping will shortly be commenced in the same level at the junction where the lode contains a good deal of blende and good stones of lead. The north-west end, 15 fathom level, on the Schmelzer north lode, was driven last month 2 fms. 1 ft. 8 in.; the lode was and still is very fairly productive of blende; a good pile of ore from this end has been sent to surface, and will be shortly dressed; the ore-bearing portion of the lode is about 18 in. wide, carrying leaders of solid ore from 3 to 6 in. wide. Some 4 fms. length of good stoping ground has been laid open. The end is being driven by two men, and two men are employed stoping. The blende stuff lying at surface is being dressed as fast as circumstances will permit.

LANESTOSA.—May 12: **Esperanza:** The tributers are raising a little ore, but are still too much engaged on their lands to follow the mines regularly. In the back of Buena Vista adit, working on a good branch of calamine, old works have been holed into, evidently the bottom of the deposit, called "sobe-rante," which the adit was driven to intersect. The men have been put to drive a metre or two to see whether the working extend to level of adit further east.—**Agustina:** 12 metres have now been driven south on continuation of first cruzero from the cross-cut east at bottom of Bascula shaft, passing through a bed of compact silt and fine sand for the whole distance; such beds were met with, it is said, also interstratified with the calamine in the upper parts of the deposits. We have now reached the dolomitic rock, which always accompanies the calamine here, and if any of the latter reaches the depth of our workings it will now be met with.—**Santa Lucia:** The whim, incline tramway, &c., at this place are now nearly complete, but we shall not be able to use them until the wire-rope reaches us, and of this there is no news yet. The men will try to do a little raising ore next week, bringing up the stuff on their back, as before. We have been obliged to make a new piece of road in connection with the alterations here to connect the floors with the main road at Agustina ovens, it is now nearly completed.—**Asuncion:** Fissures and division in the rock are being met with in the end at Santo Tomas adit, and I hope it is an indication that we are near the lode. The rock is still very hard, and difficult to drive through. Raising ore on No. 2 lode, did not pay the men, and they have therefore left it.—**Glanrafon:** The ground at deep adit here is still stiff, and the lode continues smaller, being now only 3 ft. wide, composed entirely of gossany calc-spar, a most favourable rock for lead in this district.—**Aurora:** As stated in my last, the men at this mine have been removed to make up the extra number required at Agustina; they will probably return at the end of the month. —**La Hosa:** The deep adit end here is still in disordered ground, but the general line of the vein followed continues in the proper direction for getting under the large and well-defined lode seen at the surface further north, and we may soon expect a favourable change.—**La Luisa:** A full pare of men is now being employed at Ventura adit to push the work of cutting the lode at that point; the ground has become harder within the last few days, which will retard the work somewhat, but I trust we shall not be later than the middle of June before seeing the lode.

ALAMILLOS.—May 7: The lode in the 60 fm. level, driving west of San Rafael's shaft, is large, and producing good stones of ore, worth ½ ton per fm. The lode in the 50, driving east of La Magdalena shaft, is very small, and unproductive. We have resumed the driving of the 75, east of La Magdalena shaft, and expect an improvement shortly, there being a good lode in the level over it; producing ½ ton of ore per fathom. The lode in the 85, driving east of Taylor's engine shaft, is large, but quite unproductive at present. The lode in the 85, driving west of Taylor's engine-shaft, is more open and easy for driving, and yields large lumps of ore, worth ¾ ton per fathom. The 50, driving west of San Yago shaft, has failed in the past few days. The 40, driving east of Rica's winze and San Victor's shaft, are holed, adding a great length to the level; driving east of the winze will be commenced in a few days; the lode in San Victor's shaft being very wide, containing large lumps of lead, worth 2 tons per fathom. The lode in the 50, east of San Victor's shaft, is larger than it was, and contains good stones of ore; the ground is very hard for driving in the 50 fm. level cross-cut south of San Victor's shaft. The 30, west of San Victor's cross-cut (south lode), has been intersected by a cross-cut, and we are now driving north on its course: it produces 1 ton of ore per fathom. We have began to drive on the 40, west of middle lode, which was intersected by a cross-cut from the north lode some time since, yielding 2 tons of ore per fathom. The 40, driving west on south lode, has fallen off very much in the past week, now worth ½ ton per fathom. The 20, driving east of Addis's shaft, is opening moderately productive ground, worth 1 ton per fathom. The 40, driving east of Crosby's shaft, has fluctuated greatly in the past fortnight, and is again improving, now yielding 1½ ton of ore per fathom. A short cross-cut north has opened the main part of the lode in the 50 fm. level, driving east of Crosby's shaft; it is large and spotted with lead, yielding ½ ton per fathom. The lode in the 50, driving east of Crosby's cross-cut, is large, and easy for driving, but does not contain any lead. The lode in the 50, driving west of Crosby's cross-cut, is small, and the granite hard for driving. The 40, driving west of Crosby's cross-cut, is holed to Morris's shaft, west of which we have now begun to drive, it yields ¾ ton of ore per fathom.—**Shafts and Winzes:** In Judd's shaft, sinking below the 40, a pent-house is being fixed preparatory to sinking to a 50 fm. level. Footway's shaft, sinking below surface, is being sunk in a very promising lode, worth 1 ton of ore per fathom. The air shaft, sinking below the surface, is situated east of Crosby's shaft, and in advance of the 40: the lode is poor at present. The lode in Coba's winze, sinking below the 30, is poor at present. There is a good lode in the back of the 40, under Gabriel's winze, sinking below the 30 fm. level. The lode in Garcia's winze, below the 60, has greatly improved in the past week, yielding 2 tons per fathom. In Alejandro's winze, below the 30, the lode has diminished both in size and value, being worth 1 ton per fm. The tribute department yielded very well in the past month, and there is now no alteration in the stopes worthy of remark. The machinery is in a very efficient state, and the general surface works are going on very regularly. We estimate the raisings for May at 250 tons.

FORTUNA.—May 7: **Canada Incosa:** The lode in the 110, driving west of Henty's shaft, is improving a little, and contains good stones of ore, worth ½ ton per fathom. The 100, driving west of Judd's shaft, has fallen off greatly in the past few days, now yielding 1¼ ton of ore per fathom. The lode in the 80, driving east of Henty's cross-cut, although quite poor, is stronger and better defined than we have hitherto seen it. The 60, driving east of San Pedro's shaft, is opening productive ground, worth 1 ton per fathom. In the 90, driving east of Addis's shaft, the ground is hard for driving, and the lode unproductive. In the 80, driving west of Lownde's shaft, the men are put to open the south side, where we expect to find a part of the lode. The lode in the 80, driving east of Lownde's shaft, is very strong and productive, consisting of calcareous spar, quartz, and lead ore, yielding of the latter 2½ tons per fathom.—**Shafts and Winzes:** The lode in Lownde's shaft, sinking below the 80, is large and open, and moderately easy for sinking through, yielding 1½ ton per fathom. Serano's winze, sinking below the 70, is being sunk through a very firm, compact, and productive lode, worth 2½ tons per fathom. In Carlos winze, sinking below the 90, the lode has greatly diminished both in size and value, yielding 1 ton of ore per fathom.—**Los Salidos Mine:** The lode in the 110, driving west of Buenos Amigos shaft, is rather small at present, yielding ¾ ton of ore per fathom. The 100, driving west of San Carlos shaft, is still in a hard bar of ground between two cross-courses. The lode in the 90, driving west of San Carlos shaft, continues small and unproductive. The 110, driving east of Buenos Amigos shaft, is in a hard and unproductive bar of ground. The lode in the 110, driving east of Morris's engine-shaft, is a strong one, with large lumps of lead, worth 1½ ton per fathom. The lode in the 100, driving east of San Pablos shaft, is larger than usual, consisting chiefly of lead, decomposed granite, and carbonate of lime, yielding of the former 2 tons per fathom. In the 90, driving east of San Miguel's shaft, the lode has a very promising appearance, worth 1½ ton per fathom. The lode in the 35, west of Palgrave's shaft, is very compact, and opening a good length of productive ground, yielding 2 tons of ore per fathom. The lode in the 35, east of Palgrave's shaft, at present is small and poor.—**Shafts and Winzes:** Medina's winze, sinking below the 25, will be holed to the 35 in the present month. The lode in Lorente's winze, sinking below the 90, is small, and the ground hard for sinking. Calva's winze, sinking below the 25, is being sunk through a fine course of ore, worth 6 tons per fathom. The lode in Moron's winze, sinking below the 100, contains good lumps of ore, worth 1 ton per fathom. Gabriel's winze, sinking below the 100, is going down in a strong and valuable lode, worth 3 tons per fathom, and looks well for the 110, which will shorily be got under it. A very good rate of raising was maintained throughout the past month, and the slopes are producing very well at present. The machinery is in good working order, and the surface operations are going on very regularly. We estimate the raisings for May at 350 tons.

LINARES.—May 7: The lode in the 85, driving west of Crosby's shaft, is of a more open and promising appearance than it was. The lode in the 75, driving west of Crosby's shaft, continues small and poor. The lode in the 75, driving west of San Francisco shaft, has improved, being, although small, very compact and solid, yielding 2 tons of ore per fathom. In the 75, driving east of San Francisco shaft, the lode is small, but opening paying ground, worth 1 ton per fm. The granite is very hard for driving In the 65, west of San Francisco shaft, and the lode small and poor. The lode in the 55, driving west of San Francisco shaft, is small and regular, yielding ¾ ton per fathom. The lode in the 45, driving east of San Francisco shaft, is looking a little better than for some time past, but is of no value.—**Winzes:** No. 181 winze, sinking below the 55, is situated west of San Francisco shaft, and is worth ½ ton per fathom; this is a new winze. No. 182 winze, sinking below the 35, is situated west of San Francisco shaft; this is also a new winze. The full complement of mineral was raised from the stopes in the past month, and the tribute department is now looking moderately well. The works at surface, including the machinery, are going on very regularly. We estimate the raisings for May at 200 tons.—**Quinientos Mine:** The lode in the 45, driving east of Addis's shaft, is strong, and yields good stones of ore, but not sufficient to value. The 45, driving west of San Carlos shaft, has improved in the past week, and is now opening valuable ore ground, yielding 2 tons per fathom. The lode in the 45, driving east of San Carlos shaft, has fallen off very much lately, but it is still large, and likely to improve again shortly, producing ½ ton of ore per fathom. The lode is of no value in the 32, driving east of Judd's shaft, at present.—**Shafts and Winzes:** In Judd's shaft sinking be ow the 32, a pent-house and tackle are being fixed, and the sinking will be resumed in a few days. Henty's shaft, sinking below the 32, is off the lode, and in hard granite, The lode in Perez' winze, sinking below the 32, contains stones of lead, but not enough to value. The lode in Carrascosa's winze, sinking below the 32, has greatly diminished both in size and value, now worth 1 ton of ore per fathom. The lode in Gracia's winze, sinking below the 45, is greatly disarranged and reduced in value, producing ½ ton of ore per fathom.

PONTGIBAUD.—W. H. Rickard, May 2: **Roure Mine:** The 80 metre level, south of Agnes' shaft, yields a little saving work. The 80 cross-cut east has intersected a vein 1 ft. wide, yielding stones of orestuff, and letting out much water. The 60 metre level, south of Virginie's lode, yields ¾ ton per fathom, and the same level north ¼ ton. The 40 south yields a little saving work. The same level north has opened some good ground during the month, worth 1¼ ton of ore per fathom, but the present end is poor. The adit north yields 1½ ton per fathom, and south ½ ton. The Mill adit continues to open good ground, worth 1¼ ton of ore per fathom. At La Grange we have 10 tribute pitches working in the 100, 80, and 60 metre levels, yielding a fair quantity of low quality stuff.—**Mioche:** We have been much hindered for want of air with the adit and shallow workings, and have set the shaft to sink to open out and ventilate these workings and the ground below the adit. The tribute pitches are yielding a little good quality stuff.—**La Brousse:** The ground at Basset's shaft continues hard. The 120 south yields ¼ ton of ore per fathom; the 100, 1¼ ton; and the 80 south ½ ton per fathom for the width of the level; there yet remains a width of 10 ft. to cut. The 60 south yields 1 ton per fathom, and promises further improvement. The lode where being undercut behind this end continues to yield 3 tons per fathom.—**Pranal:** The 70 metre level north yields stones of ore. The same level, north and south of No. 4 winze, on eastern part, yields ¾ ton of ore per fathom. The 70, north of No. 2 winze, is poor. The 70 south yields 1½ ton per fathom. The 50 north looks more kindly than for some time past, showing spots of lead ore and blende. The same level, north and south of cross-cut, on western part, is unproductive. St. George's shaft is set to sink below this level by six men. The 30 south is poor. The 80, north and south, on No. 2 lode, yields no ore of value.—**Surface:** Our outdoor operations and dressing have gone on regularly, and things generally throughout the mines work to satisfaction. Our samplings have amounted to 267 tons.—**St. Amant:** The 25 north has been completely holed to the old shaft, which appears to be about 2 metres deeper, but generally is in good repair. The lode in the 25 is 3 ft. wide, yielding good patches of lead ore. The 25 shows spots of ore on the under wall of the lode.—**Labrugere:** The Laplanche adit level is unproductive. At the Moulin de Lostier the lode is 2 ft. wide, yielding stones of good silver-lead ore irregularly in barytes and friable quartz.

[For remainder of Foreign Mines see to-day's Journal.]

THE AUSTRALIAN GOLD FIELDS—THE STAWELL DISTRICT.—The value of this district is so generally recognised by gold miners that it is not anticipated that the discovery of gold in the Stockyard Creek district, which is near Port Albert, in Gippsland, and, therefore, on the opposite side of the colony, will have any effect in attracting the Stawell miners, and thus lessening the amount of labour available in the district. The Stawell district is a very old gold field, and has now for a number of years been known to possess excellent quartz mines, and during the last year or two quartz mining has extended so rapidly and profitably in the district that, although the place is 178 miles from Melbourne, there is a population of 7635 persons. The total quantity of gold raised in the district has been 842,803 ozs., of the value of 3,091,011/. The great claim of the district is the North Cross Reef Mine, which has eclipsed in yield nearly every other mine in Victoria. The company working it is divided into 10,000 shares, and 2/. 2s. per share has been paid up. On Jan. 1 last the Crown Cross Reef Company's shaft was 787 ft. deep, and the cost of sinking is 10/. per foot; it has taken three years to reach the present depth. These reefs have been worked for twelve years, and large dividends have been received from the old shaft, which caved in, after which the mine was not worked for three years, in consequence of the great expense; three claimholders joined to sink the present shaft, and they are daily expecting to come upon good stone. The subjoined table shows the quantity of stone crushed and gold obtained by the North Cross Reef Company during the past two years:—

Date.	Crushed.	Yield of gold.	Dividends.
Half-year ending—	Tons.	Ozs. dwt. grs.	
June 30, 1870	1,675	3,406 19 8	£ 9,992 1 9
Dec. 31, 1870	7,671	10,452 17 12	28,500 0 0
June 30, 1871	9,402	12,667 11 12	32,230 0 0
Dec. 30, 1871	13,131	24,495 7 18	73,500 0 0
Jan. 1, 1872, to Feb. 23	2,921	6,154 1 0	19,000 0 0

The average yield of gold is 2½ ozs. per ton of quartz crushed, and up to the present date 33,800 tons have been crushed, yielding 57,176 ozs. 17 dwts., which, after paying all expenses, has enabled the declaration of dividends amounting to 163,242/. The total cost of machinery, &c., has been scarcely over 28,000/., including the price of a new shaft, already 500 ft. down, which is expected to enable fresh workings to be undertaken at a lower level as well as to drain the claim. Among the shareholders is one who holds nearly one-fifth of the mine—Mr. Duncan M'Kellar, President of Stawell shire, owns nearly one-fourth, and there are several besides who each own one-tenth, one-twelfth, and one-fifteenth. This astonishing wealth is no less due to the quality of the quartz than to its abundance. The proprietors not only have the Cross reef, which is a vertical one, but at right angles there abuts on it the Flat reef, 6 ft. thick, and of other dimensions undefined. The Crown Cross Reef Company have 180 ft. 9 in. along the line of reef; the company consists of 2169 shares, which are held by the original holders, Messrs. Parkinson, Barker, and Grant being the largest.

MINERAL WEALTH OF CALIFORNIA.—In Trinity County an exceedingly rich quartz ledge has been discovered. The Gilroy *Advocate* of April 13 says—"Robert Stanyon and Co., of this place, have discovered what promises to be a rich quicksilver mine on the head-quarters of the Los Ranos, in the north-west corner of Fresno county. The company have a number of men working the mines, and with flattering prospects. The cinnibar assays the equivalent of $222·50 per ton." The Napa *Reporter*, of April 13, says—"Rodney Hudson showed us yesterday some very rich specimens of cinnabar, found in the mountains between St. Helena and Gnilicos Valley. The Oakville Mine has excellent prospects. The mine is now rather being prospected than worked, and yet they are reducing from 8 to 10 tons per day of ore as it comes, ranging from 1 to 5 per cent. The monthly yield is about 10,000 or 150 flasks. It is estimated that there are at least 10,000 tons of ore in sight. The company have received a United States patent for their property." The following very interesting account we have from the Inyo *Independent*—"There is in the vicinity of Columbus about 3000 acres of land, containing borate of lime and borate of soda. The deposit varies in thickness from 1 to 15 in., and the crude material, as taken from the marshes, yields about 15 per cent. of boracic acid. Hearne and Mott are manufacturing a superior quality of borax from the borate of soda. Their borax is made by a process differing entirely from that by which the English borax is made. It contains an excess of boracic acid over less per cent. of soda, hence its superiority over the European article. Their their own lands under State laws, but when the Government surveys are over them they will, of course, have to purchase of the Government. Large tities of borax can be made from these marshes, as the supply is almost inexhaustible, the borate of soda forming again within a few weeks after it has been gathered from the surface of the land. The Grass Valley *Republican* tells of a brick weighing 529 ozs., which came from the Empire Mine, and was valued at $8900. It was the product of less than a month's run. Altogether, the mining interest in California was never more promising.—*San Francisco News Letter*, 4th inst.

MINING ON THE PACIFIC COAST.

A California correspondent writes as follows, under date April 15:—

MINING LAW AMENDMENT.—An amendment to the Mining Incorporation Act of California, passed at its recent session, provides that the holders of a majority of stock in any company may petition the Judge of the County Court to order a new election for trustees whenever and as often as said majority deem the interests of the company to require a change of management. At such meeting of stockholders, so called, two-thirds of the shares must be represented, when a majority of stockholders, the old board can be ousted and new trustees and officers chosen. The operation of this law is to break up the "ring" system, by giving stockholders power to remove dishonest or incompetent officers whenever any wrong doing or artifice becomes apparent in the management, affording a degree of protection not hitherto enjoyed. It was put into execution two days after its passage by Mr. Alvinza Hayward, who owned a majority of Savage, but had no voice whatever in the management. Under the change of trustees the stock more than doubled in price at the Stock Board.

MINING PROSPECT FOR 1872.—It is from the "actual results," opening an immense field of operations, that we have a substantial basis to forecast the future of mining. The prospect wears a most cheering aspect, and the product of this year promises to be unusually large. The improvements in machinery and processes, the opening of new mines, and the erection of mills of greater capacity, capable of doing better work, warrant the prediction that our country's yield of the precious metals will aggregate from $90,000,000 to $100,000,000. Capital has come, is coming, to the expansion of the mining business with a freedom never before experienced, because never before so fully deserved. Faith in mining is shown by the fact that the shrewd, far-seeing capitalists of San Francisco and the Pacific generally are investing all their surplus or accumulated funds in new enterprises. But the field is too vast for the limited capital of the mining States and Territories, and from the Atlantic States and Europe the flow is already large, and steadily increasing in volume. Says the *San Francisco Bulletin*: "The present year will be less be the most important one for the mining interests that we have ever had in this country. All we want is for capitalists to be alive to their own interest, and all the business connected with an industry that, last year, produced $80,000,000 in solid coin will be ours. To mining men and mining operations no cold shoulder should be given. There is no pursuit which offers such great inducements and pays so well as mining, legitimately carried on. The increased interest is due to new developments, more efficient management, better facilities for transportation, improved processes for the extraction of metal, and the introduction of both foreign and home capital. Gold and silver must come, and mines must be worked to get them." Says the *Alta California*: "There never was a time in the history of the Pacific Coast when mining was so prosperous as now. This has been, in a great measure, owing to the immense change in the mode of mining. The time has passed; but the time has come when there is no better or more profitable employment for accumulated capital than in its application to the development of gold and silver from quartz." Again, says the same paper: "The aggregate amount of capital invested in the 65 leading mines dealt in at the Stock Board is $14,000,000. These same mines have paid $28,000,000 to their stockholders in dividends, and have produced $150,000,000 of the precious metals. Out of this amount miners, tradesmen, machinists, founderies, expressmen, shopkeepers, &c., have got their living, and many have acquired wealth. For these results the original investment was merely nominal. There is, at this moment, no better investment than in well managed mines, and experience has proved that no property is safer in the long run." That these very successes will supply the stimulus for putting great numbers of fraudulent mines upon the market, to the injury of incautious investors, is not to be denied. Such frauds, however, are incident to every business. Were there no genuine coin there would be no counterfeits. As frequently before, I would again impress upon the public that due caution be used in making investments. Yet when satisfied of the ability and intregrity of those asking for capital to develop valuable mines, no one should be discouraged because obstacles are encountered that even the most careful manager cannot always foresee or avoid. Perseverance will be sure to win.

HYDRAULIC GOLD MINING.—The extremely low cost at which gold deposits can be worked, when Nature permits the application of the hydraulic process, has been pointed out by nearly every miner and mine inspector who has reported upon the mines of the Pacific Coast for English capitalists; and "A Member of the Stock Exchange" has now issued (through Messrs. A. H. Baily and Co., of Royal Exchange-buildings) a pamphlet devoted exclusively to the subject. The pamphlet claims to gather together, for the first time, many items of information, opinions, and statements which have previously been so dispersed as to be inaccessible to business men, and the title chosen—"On the Profits and Prospects of Hydraulic Gold Mining in the Pacific Territorics of the United States, and the Conditions Necessary for Ensuring Success"—sufficiently explains its character. The object of the treatise is to point out the advantages of hydraulic mining generally, and of the CEDAR CREEK COMPANY'S property in particular, the advantages enjoyed by that company being explained to result from its possession of an abundance of water in its own right, so much, in fact, that it can derive profit by selling the surplus. The importance of plenty of water for this class of mining will be readily understood when it is stated that each ton of gravel washed requires more than 3000 gallons of water; that the gold is so disseminated through the gravel as to be absolutely worthless for treatment by any other means, and that miners without water rights are content to pay such enormous prices for water that the sale of 8000 inches per day of 10 hours leaves a net profit of 100,000/. per annum to the water owners. In drought alone is hydraulic mining interfered with, and as the economy of the working depends upon the quantity of water at disposal, the advantage of being at once mine owner and water owner can easily be estimated. The pamphlet contains many suggestions which may be utilised by hydraulic miners generally, and to the Cedar Creek shareholders it will prove particularly interesting.

NEW USE FOR WATER.—A contrivance that has been erected at a colonial foundry is worthy of notice. At present it is only used for blowing the ordinary blacksmith's fire, but eventually it will no doubt be used for the smelting furnace. It consists of an empty-barrel, or quarter cask, stood on end behind the fire, to the centre of which a blast-pipe, from 2 in. to 3 in. in diameter is fixed. On the top of the cask is another pipe the same size as the blast-pipe, some 6 ft. in height, with a funnel-shaped top. Just above this there is a horizontal water-pipe of the ordinary service size, with a nozzle, having an aperture of an eighth of an inch in diameter, fixed at right angles—that is, pointing down the pipe leading to the barrel, down which there rushes with considerable force a tiny jet of water, which causes a rush through the blast-pipe that is far superior both in power and steadiness to any that can be obtained from the common blacksmith's bellows. The waste water, which is very limited in quantity, escapes through a pipe attached for the purpose to the bottom of the barrel.—*Adelaide Observer*.

IMPROVED BLOWING APPRATUS FOR BLOW-PIPE OPERATIONS.—The following is a description of an improved blower by Messrs. ARMIR, JUNOT, and K. MITZOPULOS, of Freiburg. All workers with the blow-pipe are well aware how much the work is facilitated by a good blowing apparatus. In qualitative operations it can be dispensed with, but there are certain assays, such as concentrating cupellations for poor silver ores, which cannot be carried on without a blower, save with great exertion. For this reason, nearly everyone who has quantitative, assays to make provides himself with a blowing apparatus. The ordinary blowing apparatus consist of three parts, the caoutchouc bellows, the regulator, and the stand for the nozzle. The part which most easily gets out repair is the caoutchouc regulator, for the operator, looking at his assay, often does not perceive how the regulator gets too much stretched by the blast; the consequence is that the regulator often bursts. When we recollect that such regulators are not to be had everywhere, and that a reserve stock is often useless, from the caoutchouc getting hard, it becomes important to find a substitute which will give as regular a blast, and can be made of a more lasting material. It is this that we have had in view in making our regulator, and we will proceed to explain its mode of construction for the benefit of those who might happen to want one. Our regulator gives a perfectly constant blast, which can be used either for the oxidising or the reducing flame, and after numerous trials we can say that it is in no way inferior to the caoutchouc regulator. At the same time it is so simple that it can be constructed with great ease and in a very short time. The arrrangement is as follows:—A common wide-mouthed bottle is carefully fitted with a caoutchouc cork bored with two holes, into each which passes a piece of glass tube bent at a right angle. On to one of these tubes is slipped the caoutchouc tube coming from an ordinary caoutchouc bellows, while the other is put in communication with the blow-pipe nozzle by means of four pieces of caoutchouc tubing joined by three pieces of glass tube, drawn to a fine point at each end. This forms the main peculiarity of the arrangement. When air is forced into the bottle by the blower in jerks, it finds a difficulty in escaping as fast as it comes in, on account of the six fine openings in the glass tubes that it has to pass through on its way from the bottle to the nozzle, and it thus acquires a certain pressure in the bottle and flows out towards the nozzle as a regular blast. The bottle may be about 6 in high by 3½ in. wide, with a neck 1½ in. in diameter, but of course the dimensions are of no great importance. On the whole, a somewhat large bottle is better than a small one. The pieces of glass tubing we use are 2 in. long by ½ in. in diameter. The apparatus will be stronger if instead of a glass bottle a tin cylinder is used, about 4 in. high by 2 in. in diameter, with two tin tubes opening into its top. Small metal cylinders with a fine hole at each end may be used instead of the little glass tubes. A blowing apparatus constructed in this manner will deliver a perfectly regular blast, and will be of practical interest to those who are thinking of working in places where it is difficult or impossible to repair the ordinary instruments.

LUBRICATING MACHINERY.—The invention of Messrs. PATRICK MOIR CRANE and MOIR, of Manchester, consists in the preparation and application of lubricating materials from hydrocarbon oils, or substances producing those oils. The oil is distilled by a slow or cool distillation, and it is the heavier portions which are used. Oils thus prepared are used with especial advantage for lubricating purposes, particularly in compound cylinder-engines, fitted with surface condensers, and where it is desired to prevent priming in the boilers.

UTILISING SPENT PICKLE.—To obtain sulphate of soda and finely-divided peroxide of iron from the hitherto valueless and troublesome liquor, known as pickle and spent pickle, from tin-plate and tinning works, Mr. GEO. LARNER, of New York, proposes that chloride of sodium should be mixed with or added to the liquor, and the whole reduced in an apparatus or furnace to dryness. The dry mass is broken into small pieces, or ground, and heated to about incipient redness in a muffle furnace, through which a current of air or steam, or both, is passed. During the heating the mass is stirred or turned, and care taken to prevent fusion. When gas has ceased to be evolved the charge is drawn and lixiviated. The clear solution is cooled to yield crystals of glaubers salts, or evaporated to dryness to produce anhydrous sulphate of soda. The peroxide of iron being washed and dried is fit for use in the arts and manufactures. When the liquor contains over 10 per cent. of chlorine, sulphate of soda is added along with the chloride of sodium, the proportion being 142 parts of sulphate of soda to every 71 parts of chlorine.

BROTHERHOOD AND HARDINGHAM,

LATE KITTOE AND BROTHERHOOD, AND FORMERLY WILLIAM FOX,

ESTABLISHED 1824.

PATENT "HELICAL" PUMP.

THE BEST ROTARY PUMP.

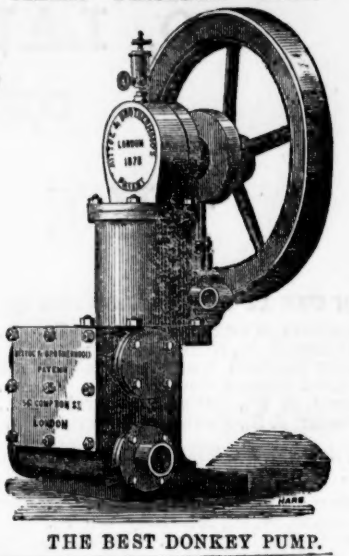
ENGINEERS AND MILLWRIGHTS,

Kittoe and Brotherhood's Patent "PARAGON" STEAM PUMPS (Sole Manufacturers).
Boulton and Imray's Patent "HELICAL" PUMPS (Sole Manufacturers).
Brotherhood's Patent "GYROSCOPIC" STEAM GOVERNORS (Sole Manufacturers).
Kittoe and Brotherhood's Patent REFRIGERATORS for Brewers' purposes (Sole Manufacturers).
Kittoe and Brotherhood's Patent PUMP VALVES (Sole Manufacturers).
Kittoe and Brotherhood's Patent HYDRAULIC PIPE JOINTS (Sole Manufacturers).
Admiral Inglefield's Patent HYDROSTATIC STEERING APPARATUS (Sole Manufacturers).
IMPROVED GAS EXHAUSTERS.
SCREW-PILE DRIVING MACHINES.
IMPROVED GAS BOILERS.

Pumping Machinery of all kinds.

56 and 53, COMPTON STREET, GOSWELL ROAD, LONDON, E.C.

PATENT "PARAGON" PUMP.

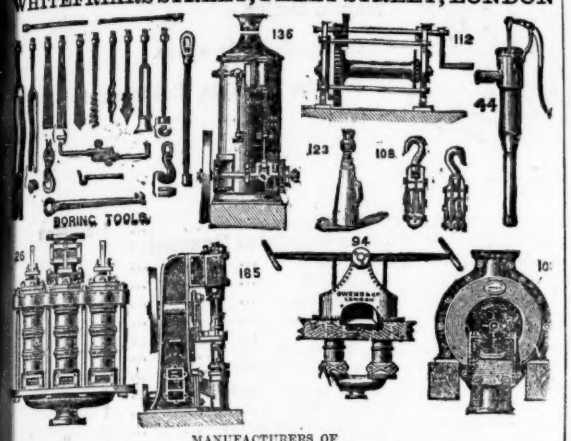


THE BEST DONKEY PUMP.

S. OWENS AND CO.,

Hydraulic and General Engineers,

WHITEFRIARS STREET, FLEET STREET, LONDON



MANUFACTURERS OF

BORING TOOLS, for testing ground for Minerals. Bridge Foundations, Artesian Wells, &c., to any depth.
No. 26.—Treble Barrel and other Deep Well Pumps.
No. 136.—Vertical and other Portable Steam Engines.
No. 185.—Horizontal and Vertical Steam Pumping Engines.
No. 112.—Single and Double-purchase Crab Winches.
No. 108.—Pulley Blocks of all sizes.
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No. 94.—Double-barrel Pumps, for Mine or Quarry use.
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No. 102.—Bernay's Patent Centrifugal Pumps, of all sizes.

ALSO EVERY OTHER DESCRIPTION OF

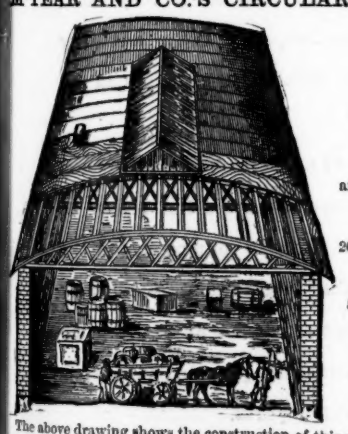
HYDRAULIC AND GENERAL MACHINERY,

COMPRISING

TURBINES, WATER WHEELS, WIND ENGINES, THE HYDRAULIC RAM, FIRE ENGINES, &c.

Catalogues and Estimates on application.

M'TEAR AND CO.'S CIRCULAR FELT ROOFING



FOR

GREAT ECONOMY

AND

CLEAR WIDE SPACE.

For particulars, estimates, and plans, address,—

M'TEAR & CO.,

20, BUDGE ROW, CANNON STREET, LONDON;

54, PORTLAND STREET, MANCHESTER;

OR,

CORPORATION STREET, BELFAST.

The above drawing shows the construction of this cheap and handsome roof, now much used for covering factories, stores, sheds, farm buildings, &c., the principals of which are double bow and string girders of best pine timber, sheeted with ½ in. boards, supported on the girders by purlins running longitudinally, the whole being covered with patent waterproof roofing felt. These roofs so combine lightness with strength that they can be constructed up to 100 ft. span without centre supports, thus not only affording a clear wide space, but effecting a great saving both in the cost of roof and uprights.

They can be made with or without top-lights, ventilators, &c. Felt roofs of any description executed in accordance with plans. Prices for plain roofs from 30s. to 60s. per square, according to span, size, and situation.

Manufacturers of PATENT FELTED SHEATHING, for covering ships' bottoms under copper or zinc.

INODOROUS FELT for lining damp walls and under floor cloths.

DRY HAIR FELT, for deadening sound and for covering steam pipes, thereby saving 25 per cent. in fuel by preventing the radiation of heat.

PATENT ASPHALTE ROOFING FELT, price 1d. per square foot.

Wholesale buyers and exporters allowed liberal discounts.

PATENT ROOFING VARNISH, in boxes from 3 gallons to any quantity required, 8d. per gallon.

KAMPTULICON.—For SITTING ROOMS.
For Halls and Passages.
For Nurseries and Washstands.
For Billiard and Toilet Mats.
Plain, and in the choicest designs.

INDIA-RUBBER DOOR MATS.

INDIA-RUBBER WATERPROOF COATS.

GARDEN HOSE.—For FLOWER GARDENS,
In 60 feet lengths, with brass fittings.

WHOLESALE and RETAIL.

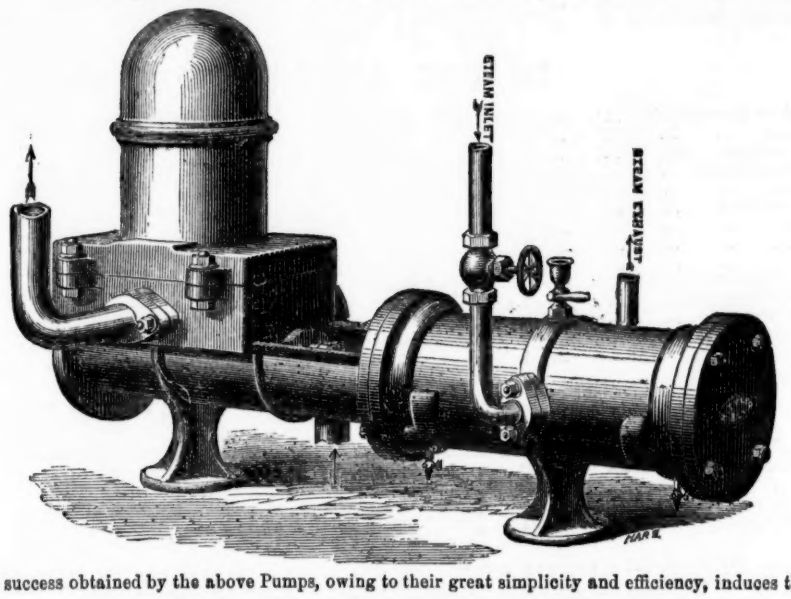
BRITANNIA RUBBER AND KAMPTULICON COMPANY,
32, Cannon-street, E.C.

THE PATENT "UNIVERSAL" STEAM PUMP,

SOLE MAKERS,

HAYWARD TYLER AND CO.,

84, WHITECROSS STREET, LONDON.



The unprecedented success obtained by the above Pumps, owing to their great simplicity and efficiency, induces their (sole) Makers,

HAYWARD TYLER AND CO.,

84, UPPER WHITECROSS STREET, LONDON,

To call the attention of Colliery Proprietors to their use. Numerous testimonials can be forwarded.

TESTIMONIALS.

To Messrs. HAYWARD TYLER and Co., 84, Upper Whitecross-street, London. *Acton Main Coal Company, near Sheffield.*

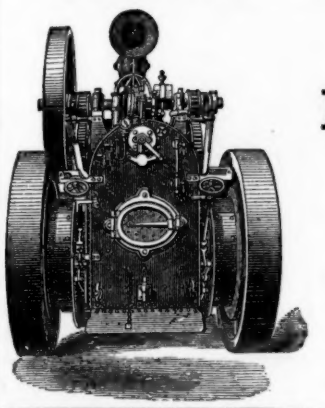
GENTLEMEN,—In answer to your enquiry, I beg to state that the two "Universal" Pumps supplied to us (through your agent, Mr. T. A. Ashton) are doing our work exceedingly well; we think they are the best in the market, and shall be glad if you will send us another 9-inch cylinder 6-inch pump, one week from this date.

Extract of a Letter from JOHN SIMPSON, Esq., to Hayward Tyler and Co.'s Agent.
Rhos Llantwit Colliery, Caerphilly, near Cardiff, March 4, 1872.

I should like to have the water-piston and clacks the same as in our present pump, as they work exceedingly well, and I do not think it is possible to improve upon the present pump, except by lining the cylinder with brass as ordered.

ROBEY AND COMPANY, LIMITED,

ENGINEERS, LINCOLN.



PATENT PORTABLE

HAULING AND WINDING ENGINE

WITH

PATENT DRUM WINDLASSES,

FOR MINING PURPOSES.

This Engine is specially commended to Mining Engineers and others, as by its adoption—
Haulage along inclined drifts is easily and cheaply effected;
The expense of sinking new shafts is greatly reduced, neither foundations nor engine-house being required;
It is available not only for winding, but for pumping, sawing, &c.—a great desideratum at a large colliery;
It can be very quickly removed (being self-propelling), and fixed in any desired position.

Prices and full particulars on application as above, and also references to view the engine in successful work near Derby, Carnarvon, Haverfordwest, Darlington, and other places.

CHAS. PRICE AND CO.'S RANGOON ENGINE OIL,

AS SUPPLIED TO H.M. DOCKYARDS AND FLEET.

THIS OIL is suitable to every kind of Machinery. As a lubricant it is equal to the best Sperm or Lard Oil, while it possesses the great advantage of being entirely free from any principle which will corrode the metal bearings.

For particular kinds of Machinery, the Oil may be specially prepared of a consistency and character adapted to the nature of the work to be done.

"Chemical Laboratory, 7, Printing House-square, Blackfriars, April, 1869.

"I herewith certify that the Rangoon Engine Oil, manufactured by Messrs. Chas. Price and Co., is free from any material which can produce corrosion of the metal work of machinery. It is indeed calculated to protect metallic surfaces from oxidation.

"The lubricating power of this oil is equal to Sperm or Lard Oil.

"T. W. KEATES, F.C.S., &c. &c."

Every parcel of the Oil sent from the work bears the Trade Mark of the Firm.

LONDON: CASTLE BAYNARD, UPPER THAMES STREET.
WORKS: MILLWALL, POPLAR; and ERITH, KENT

TANGYE BROTHERS AND HOLMAN,

10, LAURENCE POUNTNEY LANE, LONDON,

CORNWALL WORKS (TANGYE BROTHERS), BIRMINGHAM,

SOLE MAKERS OF

THE "SPECIAL" STEAM PUMPS.

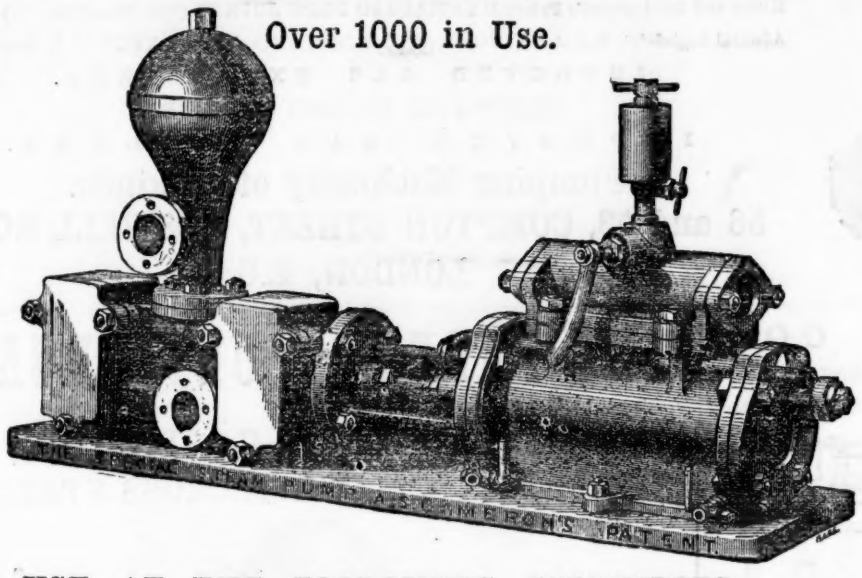
IN USE AT THE FOLLOWING QUARRIES:—

Carnarvon and Bangor Slate Co. ...	5	Pumps.
Kellow, J. E., North Wales Slate Co...	1	"
New Zealand Quartz Crushing and Gold Mining Company...	1	"
Scott, R. W., Dungannon, Ireland ...	1	"
Foster, J. S., Hebburn Quarries ...	1	"

IN USE AT THE FOLLOWING CHEMICAL WORKS:—

Alum and Ammonia Co., Bow Common	2	Pumps.
Barnes, W. C., Hackney Wick... ...	2	"
Burt, Boulton, and Hayward, Tar Works, Millwall	1	"
Cory and Co., Manor-street, Old Kent-road	2	"
Whiffen, Thomas, Battersea	1	"
Jones, W., and Co., Middlesborough...	4	"
Jarrow Chemical Co., South Shields..	1	"
Richardson, J. G. and N. H., Jarrow-on-Tyne	1	"
Read, Holliday, & Sons, Huddersfield	1	"
Sheldon, Nixon, and Co., West Jarrow	2	"
Tennant, C., and Co., near Newcastle.	7	"
Webb, H., & Co. (Manure), Worcester	1	"
Union Chemical Company, Stratford..	1	"

Over 1000 in Use.



NOTE,

Requires NO Shafting, Gearing, Riggers, or Belts.

All Double-Acting:

Works at any Speed, and any Pressure of Steam.

Will Force to any Height.

Delivers a constant stream.

Can be placed any distance away from a Boiler.

Occupies little space.

Simple, Durable, Economical.

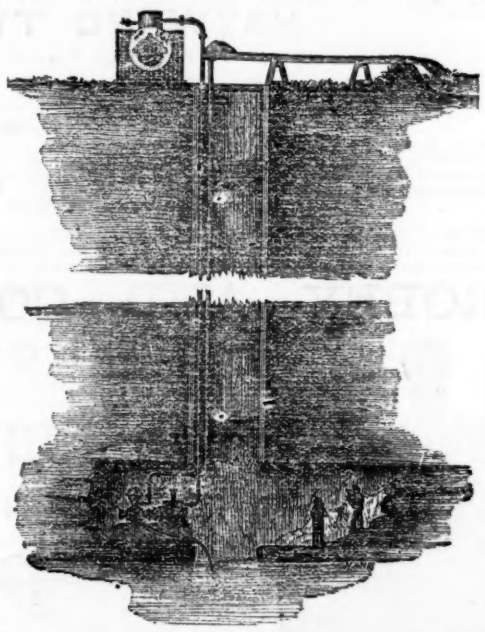
IN USE AT THE FOLLOWING COLLIERIES:—

Adelaide Colliery, Bishop Auckland	3	Pumps.
Acomb Colliery, Hexham	1	"
Blackfell Colliery, Gateshead	1	"
Black Boy Colliery, Gateshead	1	"
Castle Eden Colliery	2	"
Crofton, J. Ct., near Ferryhill	1	"
Carr, W. C., Newcastle	4	"
Etherley Colliery	1	"
Gidlow, T., Wigan	3	"
Haswell, Shotton, and Easington Coal Co. ...	2	"
Lochgelly Iron and Coal Company	1	"
Leather, J. T., near Leeds	2	"
Lumley Colliery, Fence Houses	1	"
Monkwearmouth Colliery, Sunderland... ...	1	"
North Bitchburn Colliery, Darlington	2	Pumps.
Newton Cap Colliery, Darlington...	1	"
Normanby Mines	1	"
Oakenshaw Colliery	1	"
Pease's West Colliery	2	"
Pease, J. and J. W., near Crook	5	"
Pease, J. and J., Brandon Colliery	1	"
Pegswood Colliery, near Morpeth	2	"
Pelton Fell Colliery	1	"
Railey Fell Colliery, Darlington	1	"
Right Hon. Earl Durham, Fence Houses ...	1	"
Skelton Mines	1	"
South Benwell Colliery	4	"
St. Helens (Tindale) Colliery	1	"
Stott, James, and Co., Burslem	1	Pump
Seaton Delaval Coal Company, near Newcastle	1	"
Thornley Colliery, Ferryhill	1	"
Thompson, John, Gateshead	2	"
Trimdon Grange Colliery	1	"
Tudhoe Colliery	4	"
Vobster and Mells Colliery	2	"
Widdrington Colliery, Morpeth	2	"
Whitworth and Spennymoor Colliery	3	"
Westerton Colliery, Bishop Auckland	1	"
Wardley Colliery, Gateshead	1	"
Westminster Brymbo Coal Company	2	"
Weardale Coal and Iron Company	5	"

IRONWORKS AND ROLLING MILLS:—

Bede Metal Company, Jarrow	11	Pumps.
Bagnall, C. and T., Grosmont Ironworks ...	2	"
Consett Ironworks	2	"
Castleford Foundry Company, Normanton ...	1	"
Ellen Rolling Mills, Maryport	1	"
Gilkes, Wilson, Pease, and Co , Middlesboro'..	2	Pumps.
Lloyd and Co., Middlesborough	1	"
Solway Hematite Iron Company, Maryport ...	1	"
Vaughan, Thomas, Middlesborough	2	"
The Shotts Iron Company, Edinburgh	1	"
Whitwell and Co., Stockton	3	Pumps
Whessoe Ironworks, Darlington	1	"
West Cumberland Hematite Iron Company ...	1	"
Westbury Iron Company	1	"

THE "SPECIAL" STEAM PUMP AS APPLIED FOR DRAINING MINES.



The arrangement in the accompanying illustration shows an economical method of draining mines without the expense of erecting surface-engines, fixing pump-rods, or other gearing. A boiler adjacent to the pit's mouth is all that is necessary on the surface; from thence steam may readily be taken down, by means of a felted steam-pipe, to connect the pump with the boiler. The pump may be placed in any situation that may be convenient for working it, and connecting the steam, suction, and delivery pipes.

These engines can be fixed and set to work in a comparatively short time, and also at a very small outlay. They are used in large mines as auxiliary engines, and will be found invaluable adjuncts in all mining operations.

To estimate the quantity of water to be raised by any given size of pump refer to the tabulated list below. It is recommended to use long-stroke pumps where the height exceeds 100 ft., so that the largest result may be obtained with a minimum wear and tear of the pump pistons and valves. The pumps are provided with doors for ready access to all working parts.

PRICES OF THE "SPECIAL" STEAM PUMPS.

Diameter of Steam Cylinder .....inches	2¾	3	4	4	6	6	6	7	7	7	8	8	8	8	10	10	12	12	14	16	26
Diameter of Water Cylinder ....inches	1¼	1¼	2	4	3	4	6	5	6	7	4	6	7	8	6	7	8	10	8	7	6¼
Length of Stroke ....inches	6	9	9	12	12	12	12	12	12	12	12	12	12	18	12	12	18	24	48	24	72
Strokes per minute	100	100	70	50	50	50	50	50	50	50	50	50	50	35	50	50	35	—	—	—	—
Gallons per hour	310	680	815	3250	1830	3250	7330	5070	7330	9750	3250	7330	9750	13,000	7330	9750	13,000	—	—	—	—
PRICE.....	£10	£15	£20	£35	£30	£40	£47 10	£50	£52 10	£57 10	£50	£55	£65	£85	£70	£80	£100	—	—	—	—

IF BRASS LINED, OR SOLID BRASS OR GUN-METAL WATER CYLINDERS, WITH COPPER AIR VESSELS, EXTRA, ACCORDING TO SIZE.

Any Combination can be made between the Steam and Water Cylinders, provided the Lengths of Stroke are the same, thus—8 in. Steam and 3 in. Water, or 10 in. Steam and 3 in. Water, adapted to height of lift and pressure of steam, and so on.

TANGYE BROTHERS & HOLMAN, 10, Laurence Pountney-lane, London, E.C.

Printed by RICHARD MIDDLETON, and published by HENRY ENGLISH (the proprietors), at their office, 26, FLEET STREET, E.C., where all communications are requested to be addressed.—May 25, 1872.